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ABSTRACT

This report accompanies H.R. 1757, the National Information Infrastructure Act of 1993. The bill, intended to provide for a coordinated federal program to accelerate development and dissemination of applications of high-performance computing and high-speed networking, is favorably reported by the Committee on Science, Space, and Technology with an amendment. The text of the amendment is included. The report is presented in 13 sections: (1) summary, including background and need for legislation, purpose of bill, and budget explanation; (2) committee actions; (3) explanation of committee amendment, including computing and networking applications program provision, network access, applications research, education applications, health care applications, library applications, applications for government information, High-performance Computing and Applications Advisory Committee amendments, and National Research and Education Network (NREN) amendments; (4) sectional analysis of H.R. 1727; (5) committee views on management of applications program, networking technologies, the High-performance Computing and Applications Advisory Committee, and support for training; (6) legislative history; (7) committee oversight findings and recommendation; (8) oversight findings and recommendations by the Committee on Government Operations; (9) Congressional Budget Office cost estimate; (10) impact on inflation; (11) committee recommendation; (12) changes in existing law made by the bill; and (13) correspondence with other committees. (TMK)

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103D CONGRESS
1st Session
HOUSE OF REPRESENTATIVES
REPORT
103–173

ED 366 320

NATIONAL INFORMATION INFRASTRUCTURE ACT OF 1993

JULY 13, 1993.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BROWN of California, from the Committee on Science, Space, and Technology, submitted the following

REPORT

[To accompany H.R. 1757]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, Space, and Technology, to whom was referred the bill (H.R. 1757) to provide for a coordinated Federal program to accelerate development and dissemination of applications of high-performance computing and high-speed networking, and for other purposes, having considered the same, report favorably thereon with an amendment and recommend that the bill as amended do pass.

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The amendment is as follows:

Strike out all after the enacting clause and insert in lieu thereof the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Information Infrastructure Act of 1993".

SEC. 2. FINDINGS.

The Congress finds that—

(1) high-performance computing and high-speed networks have proven to be powerful tools for improving America's national security, industrial competitiveness, research capabilities, and ability to make a wide array of information available for a variety of applications;

(2) Federal programs, such as the High-Performance Computing Program and National Research and Education Network established by Congress in 1991, are vital to the maintenance of United States leadership in high-performance computing and high-speed network development, particularly in the defense and research sectors;

(3) high-performance computing and high-speed networking have the potential to expand dramatically access to information in many fields, including education, libraries, government information dissemination, and health care, if adequate resources are devoted to the research and development activities needed to do so;

(4) high-performance computing and high-speed networking have the potential to expand opportunities for participation for Americans who have disabilities and to improve equality of opportunity, full participation, independent living, and economic self-sufficiency for Americans with disabilities;

(5) the Federal Government should ensure that the applications achieved through research and development efforts such as the High-Performance Computing Program directly benefit all Americans;

(6) the Federal Government should stimulate the development of computing and networking applications and support wider access to network resources so that the benefits of applications so developed can reach the intended users throughout the Nation, including users with disabilities; and

(7) a coordinated, interagency undertaking is needed to identify and promote applications of computing and networking advances developed by the High-Performance Computing Program which will provide large economic and social benefits to the Nation, including new tools for teaching, the creation of digital libraries of electronic information, the development of standards and protocols to make the stores of government information readily accessible by electronic means, and computer systems to improve the delivery of health care.

SEC. 3. APPLICATIONS OF THE HIGH-PERFORMANCE COMPUTING PROGRAM.

The High-Performance Computing Act of 1991 is amended by adding at the end the following new title:

"TITLE III—APPLICATIONS OF COMPUTING AND NETWORKING

"SEC. 301. ESTABLISHMENT OF APPLICATIONS PROGRAM.

"(a) ESTABLISHMENT.—The Director, through the Federal Coordinating Council for Science, Engineering, and Technology, shall, in accordance with this title—

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"(1) establish a coordinated interagency applications program to develop applications of computing and networking advances achieved under the Program described in section 101, that are designed to be accessible and usable by all persons in the United States, including historically underserved populations and individuals with disabilities, in the fields of education, libraries, health care, the provision of government information, and other appropriate fields; and

"(2) develop a Plan for Computing and Networking Applications (hereafter in this title referred to as the 'Plan') describing the goals and proposed activities of the applications program established under paragraph (1), taking into consideration the recommendations of the advisory committee on high-performance computing and applications established under section 101(b).

The President shall designate the Federal agencies and departments which shall participate in the applications program established under paragraph (1). The applications program may be administered as part of the Program established under section 101.

"(b) COLLABORATION WITH NON-FEDERAL ENTITIES.—To the maximum extent possible, the applications program shall involve cost sharing and partnerships among participating Federal departments and agencies, State and local governments, and private sector entities.

"(c) INTEROPERABLE INFORMATION SYSTEMS.—In selecting projects for support under this title, special consideration shall be given to projects which will promote development of interconnected and interoperable information systems.

"(d) NONDEVELOPMENTAL ITEMS.—In carrying out activities under this Act, Federal departments and agencies shall purchase nondevelopmental items whenever possible.

"SEC. 302. PLAN FOR COMPUTING AND NETWORKING APPLICATIONS.

"(a) REQUIREMENT.—The Plan shall contain a statement of steps which should be taken to implement the applications program established under section 301(a)(1) for the fiscal year in which the Plan is submitted and the succeeding four fiscal years, and shall be submitted to the Congress within one year after the date of enactment of this title. The Plan shall be revised and resubmitted to the Congress at least once each two years thereafter.

"(b) CONTENTS.—The Plan shall—

"(1) establish the goals and priorities for the applications program established under section 301(a)(1), consistent with this Act;

"(2) set forth the specific responsibilities of each Federal agency and department participating in the applications program established under section 301(a)(1) to achieve the goals and priorities established under paragraph (1) of this subsection; and

"(3) describe the recommended levels of Federal funding required for each agency and department to carry out the specific responsibilities set forth in paragraph (2) of this subsection.

"(c) PROGRESS IN IMPLEMENTING PLAN.—(1) Accompanying the initial submission of the Plan shall be—

"(A) a summary of the achievements of Federal efforts during the preceding fiscal year to develop computing and networking applications and to advance the technologies on which the applications depend; and

"(B) any recommendations regarding additional action or legislation which may be required to assist in implementing the Plan.

"(2) Accompanying each subsequent submission of the Plan shall be—

"(A) a summary of the achievements of Federal efforts since the previous submission of the Plan to develop computing and networking applications and to advance the technologies on which the applications depend, including an estimate of the number and the demographic diversity of users served in each application;

"(B) an evaluation of the progress made toward achieving the goals and priorities established under subsection (b)(1);

"(C) a summary of problems encountered in implementing the Plan; and

"(D) any recommendations regarding additional action or legislation which may be required to assist in implementing the Plan.

"SEC. 303. RESPONSIBILITIES OF THE FEDERAL COORDINATING COUNCIL FOR SCIENCE, ENGINEERING, AND TECHNOLOGY.

"The Federal Coordinating Council for Science, Engineering, and Technology shall—

"(1) develop the Plan as provided in section 301(a)(2);

"(2) coordinate the activities of Federal agencies and departments undertaken pursuant to the Plan and report at least annually to the President, through the

Chairman of the Council, on any recommended changes in agency or departmental roles that are needed better to implement the Plan; and

"(3) assess, prior to the President's submission to the Congress of the annual budget estimate, each agency and departmental budget estimate for consistency with the Plan and make the results of that assessment available to the appropriate elements of the Executive Office of the President, particularly the Office of Management and Budget.

"SEC. 304. NOTIFICATION REQUIREMENT.

"(a) REQUIREMENT.—Each Federal agency and department designated by the President under section 301(a) as a participant in the applications program shall, as part of its annual request for appropriations to the Office of Management and Budget—

"(1) identify each element of its activities which—

"(A) contributes primarily to the implementation of the Plan; or

"(B) contributes primarily to the achievement of other objectives but aids Plan implementation in important ways; and

"(2) identify the portion of its request for appropriations that is allocated to each such element.

"(b) OFFICE OF MANAGEMENT AND BUDGET REVIEW.—The Office of Management and Budget shall review each submission received under this section in light of the goals, priorities, and agency and departmental responsibilities set forth in the Plan. The President's annual budget request shall include a statement of the portion of each appropriate agency or department's annual budget request that is allocated to efforts to achieve the goals and priorities established under section 302(b)(1).

"SEC. 305. NETWORK ACCESS.

"(a) CONNECTIONS PROGRAM.—The Plan shall include programs administered by the National Science Foundation to—

"(1) foster the development of network services in local communities which will connect institutions of education at all levels, libraries, museums, and State and local governments to each other; and

"(2) provide funds for the purchase of network services to entities described in paragraph (1), or organizations representing such entities, to connect to the Internet.

Such program shall include funding for the acquisition of required hardware and software and for the establishment of broadband connections to the Internet. Not more than 75 percent of the cost of any project for which an award is made under this subsection shall be provided under this Act.

"(b) TRAINING.—The Plan shall include programs administered by the National Science Foundation and other appropriate agencies and departments to train teachers, students, librarians, and State and local government personnel in the use of computer networks and the Internet. Training programs for librarians shall be designed to provide skills and training materials needed by librarians to instruct the public in the use of hardware and software for accessing and using computer networks and the Internet. Training programs shall include programs designed for individuals with disabilities.

"(c) REPORT.—The Director shall, within one year after the date of enactment of this title, submit a report to Congress which shall include—

"(1) findings of an examination of the extent to which the education and library communities and State and local government have access to the Internet, including the numbers and the geographic distribution, by type, of institutions having access, and including the numbers of institutions having human/computer interfaces suitable for use by individuals with disabilities;

"(2) a statement of the extent to which broadband connections to the Internet exist for the education and library communities and State and local governments, including the numbers and the geographic distribution, by type, of institutions having access;

"(3) an assessment of the factors limiting access by institutions of education at all levels, libraries, and State and local governments to the Internet and an estimate of the cost of providing universal broadband access for those institutions to the Internet; and

"(4) recommendations for collaborative programs among Federal, State, and local governments and the private sector to expand connectivity to the Internet for educational institutions, libraries, and State and local governments.

"(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of this section, $15,000,000 for fiscal year 1994, $30,000,000 for fiscal year 1995, and $50,000,000 for fiscal year 1996.

"SEC. 306. RESEARCH IN SUPPORT OF APPLICATIONS.

"(a) IN GENERAL.—The Plan shall specify the basic and applied research and human resource development activities in areas, such as computer science and engineering, mathematics, computer visualization, and human cognition, that will provide the foundation for achieving the applications included in the Plan. The Plan shall include basic and applied research activities related to the long-range social and ethical implications of applications of high-speed networking and high-performance computing. The Plan shall specify those activities included in the Program under title I which contribute to the development of applications included in the Plan.

"(b) NETWORK SECURITY AND PRIVACY.—The Plan shall specify research programs needed to create means to—

"(1) ensure the security and privacy of transmissions over the Internet and the integrity of digital information accessed via the Internet; and

"(2) facilitate the management and protection of copyrighted information which is accessed via the Internet.

"(c) EASE OF INTERNET USE.—The Plan shall specify research programs needed to develop and demonstrate human/computer interfaces that will simplify access to and use of the Internet by nonspecialists in computing and networking technologies and by individuals with disabilities.

"(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated for the purposes of this section, $6,000,000 for fiscal year 1994, $15,000,000 for fiscal year 1995, $20,000,000 for fiscal year 1996, $20,000,000 for fiscal year 1997, and $20,000,000 for fiscal year 1998.

"SEC. 307. APPLICATIONS FOR EDUCATION.

"(a) IN GENERAL.—The Plan shall specify projects to develop and apply computing and networking technologies for use in education at all levels from early childhood education through higher education, including projects for the education and training of individuals with disabilities. The National Science Foundation shall be the lead agency for implementing the activities required by this section, and shall consult with the Department of Education in implementing those activities. Activities under this section shall include—

"(1) projects, including support for acquisition of required computer hardware and software, that demonstrate the educational value of the Internet, including cost effectiveness, in providing for advances in distance learning and electronic classrooms, facilitating nationwide communication among educators and students, access to databases of information in digital format, and access to innovative curricular materials;

"(2) development, testing, and evaluation of computer systems, computer software, and computer networks for—

"(A) teacher training, including teachers in special education programs; and

"(B) informal education outside of school, including workforce training in mathematics, science, and technology and in specific job-related skills, including literacy; and

"(3) development, testing, and evaluation of advanced educational software and of network-based information resources.

"(b) ELEMENTARY AND SECONDARY EDUCATION.—In accordance with subsection (a), applications for elementary, secondary, and vocational/technical education shall be designed to complement and strengthen ongoing national, State, and local educational restructuring and reform activities and shall include—

"(1) projects in computing and networking that—

"(A) provide for network connections among elementary and secondary schools in local regions and connections to the Internet to enable students and teachers to—

"(i) communicate with their peers;

"(ii) communicate with educators and students in institutions of higher education; and

"(iii) access educational materials and other computing resources;

"(B) address the needs of rural populations and of urban communities; and

"(C) address the needs of individuals with disabilities;

"(2) collection and dissemination of information about ongoing elementary and secondary educational projects, including special education projects, based on application of computing and networking technologies, and about other educational resources available over the Internet;

"(3) development and evaluation of undergraduate courses in the educational applications of computing and networking for the instruction of students preparing for teaching careers, including courses that will ensure the early familiarization and training of these students in the use of the Internet; and

"(4) development, testing, and evaluation of educational software designed for collaborative use over the Internet, including tools that will enable classroom teachers easily to adapt software to local conditions.

"(c) COOPERATION.—In carrying out the requirements of this section, the National Science Foundation, the Department of Education, and other Federal agencies participating in such activities shall work with the computer hardware, computer software, and communications industries, authors and publishers of educational materials, State education departments, and local school districts, as appropriate.

"(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of this section, $16,000,000 for fiscal year 1994, $45,000,000 for fiscal year 1995, $60,000,000 for fiscal year 1996, $75,000,000 for fiscal year 1997, and $75,000,000 for fiscal year 1998.

"SEC. 308. APPLICATIONS FOR HEALTH CARE.

"(a) IN GENERAL.—The Plan shall specify projects to develop and apply high-performance computing and high-speed networking technologies for use in the health care sector, with the goal of improving the quality and enhancing the cost-effectiveness of health care. Special consideration shall be given to applications that are designed to lower health care costs. The Department of Health and Human Services, through the National Institutes of Health and the Centers for Disease Control and Prevention, shall be the lead agency for implementing the activities required by this section.

"(b) CLINICAL INFORMATION SYSTEMS.—In accordance with subsection (a), applications related to clinical information systems shall include—

"(1) testbed networks for linking hospitals, clinics, doctor's offices, medical schools, medical libraries, and universities to enable health care providers and researchers to share medical images and to develop computer-based records;

"(2) software and visualization technology for visualizing the human anatomy and analyzing diagnostic images and records;

"(3) virtual reality technology for simulating surgical and medical procedures;

"(4) collaborative technology to allow several health care providers in remote locations to provide real-time treatment to patients;

"(5) interactive technologies to allow health care providers to monitor, evaluate, and treat patients in nonclinical settings;

"(6) database technology to provide health care providers with access to relevant medical information and literature;

"(7) database technology for storing, accessing and transmitting patients' medical records while protecting the accuracy and privacy of those records;

"(8) numerical simulation of chemical interactions relevant to reducing the time and cost of drug development;

"(9) three dimensional geometric modeling and artificial intelligence methods for interpreting an array of medical images; and

"(10) complex simulations of sociological populations affected disproportionately by selected diseases or disorders.

"(c) HEALTH INFORMATION TO THE PUBLIC.—In accordance with subsection (a), applications related to delivery of health information to the public shall include—

"(1) development, testing, and evaluation of database and network technologies for the storage of consumer-oriented, interactive, multimedia materials for health promotion, and for the distribution of such materials to public access points, such as community health and human service agencies, Centers for Independent Living established by the Rehabilitation Act of 1973, organizations established by title I of the Technology-Related Assistance for Individuals with Disabilities Act of 1988, schools, and public libraries;

"(2) pilot programs to develop, test, and evaluate the effectiveness and cost efficiency of interactive, multimedia materials to assist patients in deciding among health care options;

"(3) development and demonstration of human/computer interfaces to allow nonspecialists in computing and networking technologies ease of access to and use of databases of health information and networks providing health information service; and

"(4) development, testing, and evaluation of database and network access technologies to provide individuals with health information, including health risk appraisal, preventative medical advice, and disease treatment options,

which is oriented to nonhealth professionals and which is customized to take into consideration an individual's medical history.

"(d) HEALTH DELIVERY SYSTEMS AND POPULATION DATA SETS.—In accordance with subsection (a), applications for health delivery systems and for gathering population data sets shall include—

"(1) testbed networks and software that permits collaborative communication among local public and private health and human service providers, such as health centers, clinics, entitlement offices, and school-based clinics, to enable health and human service providers to work together in delivering coordinated services for at-risk populations;

"(2) pilot programs to develop high speed communications networks and software for providing health care providers with—

"(A) immediate, on-line access to up-to-date clinic-based health promotion and disease prevention recommendations from the Centers for Disease Control and Prevention and other Public Health Service agencies; and

"(B) a two-way communications link with prevention specialists in State and local health departments, and other agencies with information germane to clinic-based health promotion and disease prevention; and

"(3) development, testing, and evaluation of database technologies to provide clinicians with access to information to guide and assist them in providing diagnosis, providing treatment, and providing advice regarding health promotion and disease prevention to patients, and to facilitate the gathering of systematic population data sets in compatible formats on the efficacy of treatments and on national health trends.

"(e) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Secretary of Health and Human Services for the purposes of this section, $22,000,000 for fiscal year 1994, $54,000,000 for fiscal year 1995, $72,000,000 for fiscal year 1996, $90,000,000 for fiscal year 1997, and $90,000,000 for fiscal year 1998.

"SEC. 309. APPLICATIONS FOR LIBRARIES.

"(a) IN GENERAL.—The Plan shall specify projects to develop technologies for 'digital libraries' of electronic information. The National Science Foundation shall be the lead agency for implementing the activities required by this section, and in implementing this section shall take into account the needs of individuals with disabilities.

"(b) DIGITAL LIBRARIES.—In accordance with subsection (a), activities to support the development of digital libraries shall include—

"(1) development of advanced data storage systems capable of storing hundreds of trillions of bits of data and giving thousands of users simultaneous and nearly instantaneous access to that information;

"(2) development of high-speed, highly accurate systems for converting printed text, page images, graphics, and photographic images into electronic form;

"(3) development of database software capable of quickly searching, filtering, and summarizing large volumes of text, imagery, data, and sound;

"(4) encouragement of the development and adoption of common standards and, where appropriate, common formats for electronic data;

"(5) development of computer-based means to categorize and organize electronic information in a variety of formats;

"(6) training of database users and librarians in the use of and development of electronic databases;

"(7) development of means for simplifying the utilization of networked databases distributed around the Nation and around the world;

"(8) development of visualization methods for quickly browsing large volumes of imagery; and

"(9) development of means for protecting copyrighted material in electronic form, including, if technologically feasible, systems with capabilities for electronically identifying copyrighted works and for electronically indicating whether any permission which is required by title 17, United States Code, has been granted by the copyright owner.

"(c) DEVELOPMENT OF PROTOTYPES.—In accordance with subsection (a), the Plan shall provide for the development of prototype digital libraries to serve as testbeds for the systems, software, standards, and methods developed under subsection (b). The development of prototype digital libraries may involve nonprofit, private institutions that collect and maintain specimens, materials, or other items used in research, such as natural history museums. The prototype digital libraries shall be accessible by the public via the Internet. In carrying out this subsection, an evaluation shall be conducted of the suitability and utility of distributing electronic information

over the Internet, including cataloging and evaluating the kinds of uses and determining barriers that impair use of the Internet for this purpose.

"(d) DEVELOPMENT OF DATABASES OF REMOTE-SENSING IMAGES.—The National Aeronautics and Space Administration shall develop databases of software and remote-sensing images to be made available over computer networks.

"(e) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated—

"(1) to the National Science Foundation for the purposes of this section, $8,000,000 for fiscal year 1994, $16,000,000 for fiscal year 1995, $22,000,000 for fiscal year 1996, $32,000,000 for fiscal year 1997, and $32,000,000 for fiscal year 1998; and

"(2) to the National Aeronautics and Space Administration for the purposes of this section, $4,000,000 for fiscal year 1994, $8,000,000 for fiscal year 1995, $10,000,000 for fiscal year 1996, $12,000,000 for fiscal year 1997, and $12,000,000 for fiscal year 1998.

"SEC. 310. APPLICATIONS FOR GOVERNMENT INFORMATION.

"(a) IN GENERAL.—The Plan shall specify projects needed to develop and apply high-performance computing and high-speed networking technologies to provide improved public access to information generated by Federal, State, and local governments, including access by individuals with disabilities.

"(b) LEAD AGENCY.—The President shall designate a lead agency for implementing the activities required by this section. The lead agency shall issue policy guidelines designed to foster—

"(1) a diversity of public and private sources for, and a competitive marketplace in, information products and services based on government information; and

"(2) dissemination of government information to the public on a timely, equitable, and affordable basis and in a manner that will promote the usefulness of the information to the public.

"(c) PROJECTS.—In accordance with subsection (a), projects shall be undertaken which—

"(1) connect depository libraries and other sources of government information to the Internet to enable—

"(A) access to Federal Government information and databases in electronic formats;

"(B) access to State or local government information;

"(C) access to related resources which enhance the use of government information, including databases available through State projects funded pursuant to the Technology-Related Assistance for Individuals with Disabilities Act of 1988; and

"(D) linkages with other libraries and institutions to enhance use of government information; and

"(2) demonstrate, test, and evaluate technologies to increase access to and to facilitate effective use of government information and databases for support of research and education, economic development, and an informed citizenry.

"(d) FEDERAL INFORMATION LOCATOR.—In accordance with subsection (a), an information locator system shall be established which is accessible by the public via the Internet and which provides citations to Federal information and guidance on how to obtain such information.

"(e) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated for the purposes of this section, $4,000,000 for fiscal year 1994, $12,000,000 for fiscal year 1995, $16,000,000 for fiscal year 1996, $21,000,000 for fiscal year 1997, and $21,000,000 for fiscal year 1998.".

SEC. 4. HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE.

Section 101(b) of the High-Performance Computing Act of 1991 is amended to read as follows:

"(b) HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE.—(1) The Director shall establish an advisory committee on high-performance computing and applications consisting of non-Federal members, including representatives of the research and library communities, education at all levels, consumer and public interest groups, network providers, and the computer hardware, computer software, telecommunications, publishing, and information industries, who are specially qualified to provide the Director with advice and information on high-performance computing and on applications of computing and networking. The recommendations of the advisory committee shall be considered in reviewing and revising the Program

described in this section and the Plan required by section 301(a)(2). The advisory committee shall provide the Director with an independent assessment of—

"(A) progress in implementing the Program described in this section and the Plan required by section 301(a)(2);

"(B) the need to revise the Program described in this section and the Plan required by section 301(a)(2);

"(C) the balance between the components of the activities undertaken pursuant to this Act;

"(D) whether the research, development and demonstration projects undertaken pursuant to this Act are—

"(i) helping to maintain United States leadership in computing and networking technologies and in the application of those technologies; and

"(ii) promoting competitive private sector markets in the provision of products and services related to these technologies and their applications;

"(E) whether the applications developed under title III are successfully addressing the needs of the targeted populations, including assessment of the number of users served by those applications; and

"(F) other issues identified by the Director.

"(2) The advisory committee established under paragraph (1) shall meet not less than once annually, following notice in the Federal Register, for the purpose of receiving oral and written public testimony on the subjects identified in subparagraphs (A) through (F) of paragraph (1). The advisory committee shall compile and submit an annual report to the Director and to the Congress containing the findings and recommendations required under this subsection and summarizing the public testimony received. In addition, the advisory committee may meet periodically as determined by its members.

"(3) The Director shall provide such support as is required to allow the advisory committee established under paragraph (1) to meet and to carry out the responsibilities assigned by this subsection.".

SEC. 5. NATIONAL RESEARCH AND EDUCATION NETWORK AMENDMENTS.

Section 102 of the High-Performance Computing Act of 1991 is amended to read as follows:

"SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK PROGRAM.

"(a) ESTABLISHMENT.—As part of the Program described in section 101, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, the Department of Education, and other agencies participating in the Program shall support the establishment of the National Research and Education Network Program. The Network Program shall consist of the following components:

"(1) Research and development of networking software and hardware required for developing high-performance data networking capabilities with the goal of achieving the transmission of data at a speed of one gigabit per second or greater.

"(2) Federal experimental test bed networks for—

"(A) developing and demonstrating advanced networking technologies resulting from the activities described in paragraph (1), including any reasonably necessary assessment of the reliability of such technologies under realistic operating conditions; and

"(B) providing connections and associated network services for purposes consistent with this Act which require levels of network capabilities not commercially available.

"(3) Provision of support for researchers, educators, and students to obtain access to and use of the Internet to allow for communication with other individuals in the research and education communities and to allow for access to high-performance computing systems, electronic information resources, other research facilities, and libraries.

"(b) TEST BED NETWORK CHARACTERISTICS.—The test bed networks shall—

"(1) be developed and deployed in coordination with the computer hardware, computer software, telecommunications, and information industries;

"(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

"(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

"(4) be designed and operated in a manner which promotes and encourages research and development leading to the creation of commercial data trans-

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mission standards, enabling the establishment of privately developed high-speed commercial networks;

"(5) be designed and operated so as to ensure the application of laws that provide network and information resources security, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

"(6) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the test bed networks and, where appropriate and technically feasible, for their usage of the test bed networks; and

"(7) be interoperable with Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network.

"(c) NETWORK ACCESS.—The Federal agencies and departments participating in activities under this section shall develop a plan with specific goals for implementing the requirements of subsection (a)(3), including provision for financial assistance to educational institutions, public libraries, and other appropriate entities. This plan shall be submitted to the Congress not later than one year after the date of enactment of the National Information Infrastructure Act of 1993. Each year thereafter, the Director shall report to Congress on progress in implementing subsection (a)(3).

"(d) RESTRICTION ON USE OF TEST BED NETWORKS.—(1) The Federal test bed networks shall not be used to provide network services that are not related to the activities under paragraphs (1) and (2) of subsection (a) and that could otherwise be provided satisfactorily using commercially available network services. Determination of satisfactory availability shall include consideration of geographic access to and affordability of service, and timeliness and technical performance standards in providing services.

"(2) The requirements of paragraph (1) shall take effect on the date set forth in the report required under paragraph (3).

"(3) Six months following the date of enactment of the National Information Infrastructure Act of 1993, the Director, after consultation with the Federal agencies and departments supporting Federal test bed networks, shall provide a report to Congress which—

"(A) describes the technical developments necessary to allow implementation of paragraph (1);

"(B) determines the earliest feasible date for implementing paragraph (1); and

"(C) sets forth that date as the date on which paragraph (1) shall take effect. Should the Director subsequently determine that, for technical reasons, the requirements of paragraph (1) can not be imposed on that date, the Director shall, not less than 3 months prior to that date, report to Congress on the reasons for the delay in imposing the requirements of paragraph (1), and shall set forth a new date on which paragraph (1) shall take effect.

"(e) ADVANCED RESEARCH PROJECTS AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network Program.

"(f) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Internet consistent with the purposes of this Act. These services may include the provision of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

"(g) USE OF GRANT FUNDS.—All Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

"(h) LIMITATION ON USE OF FUNDS.—Development of data communications networks pursuant to this Act shall be through purchase of standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when such purchase is not feasible, in order to minimize Federal investment in network hardware and software.".

SEC. 6. COMPETITIVE PROCUREMENTS.

Title II of the High-Performance Computing Act of 1991 is amended by adding at the end the following new section:

"SEC. 209. COMPETITIVE PROCUREMENTS.

"The Competition in Contracting Act shall apply to all procurements under this Act of $25,000 or greater.".

SEC. 7. CONFORMING AMENDMENTS.

The High-Performance Computing Act of 1991 is amended—

(1) in section 3(1)—

(A) by amending subparagraph (A) to read as follows:

"(A) accelerate progress toward a universally accessible high-capacity and high-speed data network for the Nation;"; and

(B) by striking "Network" and inserting in lieu thereof "Internet" in subparagraph (C);

(2) in section 4—

(A) by redesignating paragraphs (1), (2), (3), (4), and (5) as paragraphs (2), (7), (8), (10), and (12), respectively;

(B) by inserting before paragraph (2), as so redesignated by subparagraph (A) of this paragraph, the following new paragraph:

"(1) 'broadband' means a transmission rate for digital information on a communications network which exceeds the maximum rate possible for transmission of digital information on normal copper telephone wires;";

(C) by inserting after paragraph (2), as so redesignated by subparagraph (A) of this paragraph, the following new paragraphs:

"(3) 'disabilities' means functional limitations of hearing, vision, movement, manipulation, speech, and interpretation of information;

"(4) 'educational institutions' includes institutions of early childhood education, elementary and secondary education, postsecondary education, and vocational/technical education;

"(5) 'education at all levels' includes early childhood education, elementary and secondary education, postsecondary education, and vocational/technical education;

"(6) 'Federal test bed networks' means the Federal experimental test bed networks described in section 102(a)(2);";

(D) by inserting after paragraph (8), as so redesignated by subparagraph (A) of this paragraph, the following new paragraph:

"(9) 'Internet' means the network of both Federal and non-Federal interoperable packet switched data networks;";

(E) by amending paragraph (10), as so redesignated by subparagraph (A) of this paragraph, to read as follows:

"(10) 'Network Program' means the National Research and Education Network Program established under section 102;"; and

(F) by inserting after such paragraph (10) the following new paragraph:

"(11) 'Nondevelopmental item' has the meaning given such term in section 2325(d) of title 10, United States Code; and";

(3) in section 101(a)(2) (A) and (B), by striking "Network" and inserting in lieu thereof "Federal test bed networks";

(4) in section 101(a)(2)(C), by inserting "the private sector, States, and" after "computer networks of";

(5) in section 101(a)(4)(C), by striking "establishment of the Network" and inserting in lieu thereof "Network Program";

(6) in section 201(a)(2), by striking "Network" both places it appears and inserting in lieu thereof "Internet";

(7) in section 201(a)(3), by striking "Network" and inserting in lieu thereof "Internet for the purposes of this Act";

(8) in section 201(a)(4), by inserting "consistent with section 102," before "assist regional networks";

(9) in section 202(b), by striking "$134,000,000" and inserting in lieu thereof "$111,000,000"; and

(10) in section 203(e)(1), by striking "$138,000,000" and inserting in lieu thereof "$124,000,000".

SEC. 8. USE OF DOMESTIC PRODUCTS.

(a) PROHIBITION AGAINST FRAUDULENT USE OF "MADE IN AMERICA" LABELS.—(1) A person shall not intentionally affix a label bearing the inscription of "Made in America", or any inscription with that meaning, to any product sold in or shipped to the United States, if that product is not a domestic product.

(2) A person who violates paragraph (1) shall not be eligible for any contract for a procurement carried out with amounts authorized under this Act, or under any amendment made by this Act, including any subcontract under such a contract pursuant to the debarment, suspension, and ineligibility procedures in subpart 9.4 of chapter 1 of title 48, Code of Federal Regulations, or any successor procedures thereto.

(b) COMPLIANCE WITH BUY AMERICAN ACT.—(1) Except as provided in paragraph (2), the head of each agency which conducts procurements shall ensure that such procurements are conducted in compliance with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a through 10c, popularly known as the "Buy American Act").

(2) This subsection shall apply only to procurements made for which—

(A) amounts are authorized by this Act, or by any amendment made by this Act, to be made available; and

(B) solicitations for bids are issued after the date of enactment of this Act.

(3) The Director of the Office of Science and Technology Policy, before January 1, 1995, shall report to the Congress on procurements covered under this subsection of products that are not domestic products.

(c) DEFINITION.—For the purposes of this section, the term "domestic product" means a product—

(1) that is manufactured or produced in the United States; and

(2) at least 50 percent of the cost of the articles, materials, or supplies of which are mined, produced, or manufactured in the United States.

(d) PURCHASE OF AMERICAN MADE EQUIPMENT AND PRODUCTS.—

(1) SENSE OF CONGRESS.—It is the sense of Congress that any recipient of a grant under this Act, or under any amendment made by this Act, should purchase, when available and cost-effective, American made equipment and products when expending grant monies.

(2) NOTICE TO RECIPIENTS OF ASSISTANCE.—In allocating grants under this Act, or under any amendment made by this Act, the appropriate agency or department shall provide to each recipient a notice describing the statement made in paragraph (1) by the Congress.

I. SUMMARY

BACKGROUND AND NEED FOR LEGISLATION

The national information infrastructure will play as central a role in our nation's development in the 21st Century as did roads, canals and railroads in the 19th and 20th Centuries. This infrastructure will be ubiquitous as the telephone system is today, but will carry information at least 1000 times faster. It will transmit not only voice and fax but interactive high-definition TV programming, teleconferencing, and high volumes of data from libraries and other information depositories.

To achieve the world's most modern communications network will require targeted R&D efforts to develop the means to capture the emerging capabilities of computer networks to route information at unprecedented speeds. High speed is essential to make routine such applications as transmitting medical information for real-time consultations among physicians in different clinics or accessing libraries of digital data from remote locations.

Congress recognized the importance of high-performance computing and high-speed networking for the Nation's future by passing the High-Performance Computing Act of 1991, which became P.L. 102–194 on December 9, 1991. The Act provided federal assistance, in collaboration with industry and academia, for development of advanced computer hardware and software, as well as networking technologies needed to route data at gigabit speeds. To help ensure future progress in these areas, basic research and education in computer and computational sciences also were targeted for support.

In order to capture the promise of research accomplishments in high-performance computing and high-speed networking, development and demonstration of the uses of these technologies is needed for important new applications that will benefit all of our citizens.

An example would be the development of the means for medical specialists throughout the country simultaneously to evaluate CAT scans, MRI images and other diagnostic data while the patient still resides in an examining room. Similarly, establishment of uniform formats and protocols will enable individuals throughout the nation to have access to electronically stored data in libraries and to the vast stores of government information. Development of such capabilities will hasten the day when a student sitting at home can browse through the electronic index at the Library of Congress, retrieve a specific document and have it printed on the student's laser printer, within the space of minutes.

In addition to research and development (R&D) efforts, an expansion of network connections is needed for schools and libraries throughout the United States. Better connections for schools will enable the Internet, the network of interconnected public and private data networks, to be used for fully interactive distance learning, thereby assuring that the best instruction available anywhere is available everywhere. Such network connections will also result in better communication among teachers for development of improved instructional materials and methods. Accompanying increased connections to the Internet is the need for development of user/network interfaces designed for non-specialists in computing and networking.

In February 1993, the President released a technology plan which includes proposals to accelerate the development of the information infrastructure the nation needs for the next century. The President's proposal includes federal programs to accomplish many of the R&D needs noted in the preceding paragraphs.

PURPOSE OF THE BILL

The bill amends the High-Performance Computing (HPC) Act of 1991 to establish an interagency program for development of applications of computing and networking technologies for education, libraries, health care, the provision of government information, and other appropriate fields. The Director of the Office of Science and Technology Policy (OSTP) is required to develop a program plan, including specification of agency roles and proposed funding levels. The program must focus on applications which are accessible and usable by all citizens.

The following program components are required:

1. Network access

As part of the applications plan, the National Science Foundation is tasked to assist educational institutions at all levels, libraries, and local governments to establish local networks and to connect to the Internet (the network of interoperable public and private packet-switched data networks).

2. Research in support of applications

The plan is required to specify research activities to address issues underlying all of the computing and networking applications being developed, especially research needed to provide the means to assure network security and privacy and research to develop and demonstrate user-friendly network interfaces.

3. Applications for education

The plan is required to specify applications for education at all levels. Activities must include: demonstrations of the educational uses of the Internet; development of hardware systems, software and networks for teacher training and for formal and informal education; and provision for connections among schools in local regions and for connection to the Internet.

4. Applications for health care

The plan is required to specify applications for use in the health care sector, including development of clinical information systems, provision of health information to the public, and development of health delivery systems and population data sets.

5. Applications for libraries

The plan is required to specify projects that will enable digitization, organization and storage of large quantities of electronic information; and will develop software for searching and manipulating digital libraries. Prototype digital libraries, providing public access via the Internet, are to be developed to serve as test beds for these technologies.

6. Applications for Government information

The plan is required to specify applications to provide improved public access to information generated by federal, state and local governments, including connections for depository libraries to the Internet and a requirement to establish a locator system for federal information accessible via the Internet.

In other amendments to the HPC Act of 1991, the scope of the public advisory committee to the program is broadened to encompass the applications activities, and the membership of the committee is expanded to include representation from the K–12 education community and from consumer and public interest groups. Amendments are made to the portion of the HPC Act of 1991 which establishes the National Research and Education Network (NREN) in order to define a revised NREN Program having three components: (1) research and development required for achieving gigabit data transmission rates, (2) test bed networks to demonstrate advanced networking technologies and to support applications requiring levels of network performance not otherwise available, and (3) provision of support for researchers, educators and students to obtain access to and use of the Internet for purposes consistent with the Act.

BUDGET EXPLANATION

The bill includes five-year authorizations to three agencies: the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the Department of Health and Human Services (HHS). In addition, authorizations which are not specific for particular agencies are provided for two components of the bill: research in support of applications and applications for government information. These authorizations are from sums au-

thorized in other statutes for particular agencies which participate in the applications program.

The bill establishes a process through which agencies designated by the President develop a detailed plan for the applications program, including the funding requirements for each agency. Subsequently, each participating agency is required to designate its funding requirements for the program in its annual budget submission, so that the various components of the applications program are included in the usual authorization process for each agency's budget.

The bill provides the following authorization for the major components of the applications program:

[By fiscal years, in millions of dollars]

Program	1994	1995	1996	1997	1998	Total
Connections:						
NSF	15	30	50			95
Research for applications	6	15	20	20	20	81
Education (NSF)	16	45	60	75	75	271
Health (HHS)	22	54	72	90	90	328
Libraries:						
NSF	8	16	22	32	32	110
NASA	4	8	10	12	12	46
Gov't. Info	4	12	16	21	21	74
Total	75	180	250	250	250	1005

II. Committee Actions

H.R. 1757 was introduced by Representative Rick Boucher and 18 original co-sponsors on April 22, 1993. The bill was referred solely to the Committee on Science, Space, and Technology. Within the Committee referral was made to the Subcommittee on Science.

The Subcommittee on Science held hearings on the bill on April 27, May 6, and May 11, 1993 to obtain the views of the Administration; individuals from the telecommunications, computer, software, information, and network provider industries; users of network services from the research and education communities; and individuals representing the health sciences and libraries. These witness expressed strong support for the goals and focus of the legislation, and provided constructive recommendations for modifications to the bill.

The Subcommittee met for consideration of H.R. 1757 on June 17, 1993. The Subcommittee amended and then adopted, by voice vote, an amendment in the nature of a substitute to H.R. 1757. The major changes made to the bill include:

Redesignating the bill as the "National Information Infrastructure Act of 1993";

designating all authorizations under the bill as coming from sums authorized in other statutes and modifying the authorization levels to conform more closely to the Administration's recommendations;

deleting provisions which established new staff positions at the Office of Science and Technology Policy and assigned responsibilities to those staff positions;

clarifying requirements for devising the means to protect copyrighted materials in electronic form;

requiring that data communications networks be developed through purchase of standard commercial services whenever feasible and that, for other activities supported under the bill, commercially available items be purchased whenever possible;

expanding representation on the advisory committee for the computing and networking program established by the bill to include representatives of the computer hardware, computer software and publishing industries, and adding a requirement that the committee formally solicit views from outside government on the planning and implementation of the programs established by the bill;

clarifying conditions under which use of federal test bed networks is restricted and establishing a process to define the date on which restrictions are to be applied; and

requiring the President to designate a lead agency to implement activities related to dissemination of government information and to issue policy guidelines for relevant federal programs.

On June 30, 1993, the full Committee met to markup H.R. 1757. An amendment in the nature of a substitute to H.R. 1757, as reported by the Science Subcommittee, was considered as original text for purposes of the markup. The substitute was adopted with the following changes:

Specifying that, the applications involving health care delivery, special consideration be given to projects that are designed to lower health care costs;

requiring that the Competition in Contracting Act apply to procurements under the HPC Act;

reducing the FY 1994 authorization levels for the Department of Energy and NASA under the HPC Program to the levels requested by the Administration; and

prohibiting fraudulent use of "Made in America" labels and specifying the applicability of the Buy America Act for procurements under the HPC Act.

III. Explanation of Committee Amendment

The amendment in the nature of a substitute adopted by the Committee is presented at the beginning of this report.

COMPUTING AND NETWORKING APPLICATIONS PROGRAM—GENERAL PROVISIONS

Section 3 of the amendment adds a new title III to the High-Performance Computing (HPC) Act of 1991. Title III establishes a multi-agency R&D program to apply computing and networking technologies to several designated areas and to other areas to be determined by a specified planning process. The Committee intends that the activities authorized by the amendment focus on computing and networking applications that will allow for the widest possible participation by persons residing in the United States, regardless of geographic location, economic status, or physical disabilities.

The OSTP Director is given the responsibility to put in place the mechanisms necessary to establish the applications program. The planning, coordination and implementation procedures established

for the applications program in sections 301, 302, 303 and 304 of the amendment are modeled on the High-Performance Computing (HPC) Program established by title I of the HPC Act of 1991, and the applications program may be administered as part of the HPC Program. However, if administered as part of the HPC Program, the Committee expects that all of the components of the plan for the applications program required by section 302 be explicitly included as part of the annual report required under section 101 of the HPC Act for the HPC Program. In addition, the Committee expects that the Director will monitor the implementation of the applications program to ensure that the activities undertaken are in accordance with the applications program plan.

The Committee expects that the federal agencies which implement the applications program will encourage collaborative projects with private sector companies and organizations. Federal funds should be used to stimulate new private sector investments, not to replace current private sector initiatives. Since many of the applications contemplated will involve publicly supported institutions, the Committee also expects that the participating federal agencies will undertake collaborative projects with State and local governments. Cost sharing should be present for most activities supported under the applications program.

The Committee stresses the importance of selecting projects for support under the applications program which will advance the development of a national information infrastructure, the components of which are interconnected and interoperable. The applications program should be designed to assist with the establishment of standards and protocols which will permit interoperability of connected federal and non-federal networks.

The provision [Sec. 301(d)] regarding purchase of nondevelopmental items is for the purpose of avoiding unnecessary expenditure of federal funds for items which are commercially available. The Committee intends that this provision apply when the performance of a commercially available item meets the requirements of a particular R&D project supported under the HPC Act.

The Committee intends that the term "computing" when it appears in the amendment refers to an activity which requires the use of both computer hardware and computer software.

NETWORK ACCESS

Section 305 of the amendment authorizes the National Science Foundation (NSF) to assist educational institutions, libraries, museums, and State and local governments in obtaining network connections and services. NSF is authorized to support broadband access to the Internet, but may provide support for lower capacity network services depending on the requirements of particular projects which are selected for funding. All projects supported by NSF under section 305 must involve cost sharing of not less than 25 percent from sources other than funds authorized by the HPC Act, as amended.

The Committee recognizes that institutions, which are eligible for support under section 305 and which share similar interests and perform related functions, may wish to pool their resources for ob-

taining network services. The Committee emphasizes that funds made available for fostering the development of network services in local communities and for providing for purchase of network services to connect to the Internet may be provided directly to, or to organizations acting on behalf of, educational institutions, libraries, museums, and State and local governments.

The Committee emphasizes the importance of accompanying support for network connections with support for training in the use of computer networks for personnel who are at the sites where network connections are provided. Funds appropriated for activities authorized under section 305 should be allocated so as to ensure that training needs are met for each connections award.

RESEARCH IN SUPPORT OF APPLICATIONS

Section 306 of the amendment authorizes support for basic and applied research in areas that are relevant to, and will assist in the development of, all of the computing and networking applications authorized by the amendment. The Committee anticipates that the agencies participating in the applications program will define research areas in addition to those explicitly designated for support. The Committee expects that research activities for ensuring network security and privacy will include the development of the means to ensure protection of data bases of personal information, such as computer-based patient records.

APPLICATIONS FOR EDUCATION

Section 307 of the amendment authorizes support for applications of computing and networking for education at all levels of instruction from early childhood education through higher education. Applications authorized also include workforce training in specific job-related skills and special education programs for individuals with disabilities. The Committee intends that support for educational institutions includes institutions providing special education. Although the NSF is assigned lead agency responsibility for implementing section 307, the Committee does not intend that educational applications supported be restricted to mathematics, science and engineering education.

Agencies participating in support of educational applications are authorized to support acquisition of computer hardware and software and to provide for network connections. The Committee expects that participating agencies will collaborate closely with industry and with State and local school officials in identifying the most promising computing and networking technologies for educational applications for development, testing and evaluation. The Committee does not expect that every project chosen for support will require broadband network connections. The Committee expects that the level of network connection provided for a proposed project will be tailored to the technical requirements of the project and that project support will be awarded primarily on the basis of expected educational value. In determining the educational value of projects involving use of the Internet, one factor to be considered is whether the cost associated with the application proposed by the project would permit widespread replication among educational institutions.

APPLICATIONS FOR HEALTH CARE

Section 308 of the amendment authorizes applications of computing and networking for use in the health care sector. The Committee expects that projects will be chosen for support which demonstrate how information technologies can provide improved health care services and can reduce health care costs. The range of activities authorized includes clinical information systems, provision of health information to the public, and better health delivery systems. Applications to provide access to information by the general public particularly will require development of human/computer interfaces designed for use by nonspecialists in computing and networking technologies [Sec. 308(c)(3)].

The Committee notes that historically application of computing and networking technologies in the health care sector has often resulted in information systems that cannot communicate with one another. The Committee reiterates the principle established by section 301 of the amendment that special consideration be given in the applications program to selection of projects that will promote development of interconnected and interoperable information systems.

Section 308(d) supports development of test bed networks and software to allow public health and human service providers to work collaboratively in providing services to at-risk populations. The Committee anticipates that federal agencies implementing these provisions will encourage State and local government participation in the planning of specific projects proposed for support.

The Committee intends that activities supported by the National Institutes of Health under section 308 are in addition to research pursuant to the HPC Program established by section 101 of the HPC Act of 1991.

APPLICATIONS FOR LIBRARIES

Section 309 of the amendment authorizes support for applications of computing and networking related to development of digital libraries of electronic information. The Committee calls particular attention to the need to develop common standards and formats [Sec. 309(b)(4)] to permit users to identify, locate, and access needed resources in a consistent fashion, and the need to provide training for librarians [Sec. 309(b)(6)] to facilitate use of digital libraries by the public. Managing network access to information in electronic form calls for the development of new standards through the collaborative efforts of librarians, information scientists, and sophisticated users to realize fully the benefits of digital libraries. In addition, as less technically sophisticated users seek access to digital libraries, support services and training programs will be essential for ensuring effective use of information resources available on Internet.

The Committee recognizes that the ultimate value of the national information network which the amendment is intended to advance will depend in large part on the breadth and completeness of information which can be accessed. Since much of this information is protected by copyright, the technical means developed for provision of network information services must assure that copyright is pro-

tected. A fundamental purpose of the constitutional grant of copyright is to provide an incentive to individuals to produce and disseminate creative works. Unless copyright laws are fully applied in the network environment, these incentives will dissipate over time and the value of the information highway will be greatly diminished.

The Commission intends that nothing in the amendment alter or modify title 17, United States Code, and that copyright laws apply to all activities authorized by the amendment. The amendment specially provides for R&D activities to find feasible technical solutions to allow for copyright protection [Sec. 309(b)(9)]. The Committee also notes that may digital library uses will involve materials in the public domain for which intellectual property protection is not an issue. The development of means for protection of copyrighted materials should not delay experimental projects based on information in the public domain.

Section 309(c) of the amendment authorizes development of prototype digital libraries. The Committee anticipates that these prototypes will include a broad range of information resources and will explore which types of information and data bases are suitable, and not suitable, for network distribution using existing technologies. Some of the prototypes should focus on access to federal information to stimulate use of the Internet as a dissemination channel for government information. In addition, the prototypes should include projects to explore electronic access to collections and materials in text, audio or visual formats generally inaccessible in the past, but of high research value.

APPLICATIONS FOR GOVERNMENT INFORMATION

Section 310 of the amendment authorizes activities to apply high-performance computing and high-speed networking technologies for providing improved public access to information generated by Federal, State and local governments. The Committee intends that the activities supported under this section explore how the Internet could become a primary mechanism for the delivery of government information.

The lead agency designated by the President to implement section 310 should issue policy guidelines in the context of the Federal Government's obligation to disseminate federal information in a manner useful to the general public. The requirement that policy guidelines foster a competitive marketplace in information products and services based on government information should be balanced by the accompanying requirement for the guidelines to foster a diversity of public and private information sources. Consequently, the Committee does not intend to discourage federal agencies from providing electronic information in formats and through mechanisms usable by the general public.

HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE AMENDMENTS

Section 4 of the amendment modifies section 101(b) of the HPC Act of 1991 to expand the responsibilities of the advisory committee for the HPC Program in order to encompass the applications program established by section 301. The amendment increases the

range of representation of members chosen by the OSTP Director for service on the advisory committee, but the committee expects that that each individual on the advisory committee may represent more than one area of expertise specified in section 101(b)(1). The size of the advisory committee will be determined by the Director.

The Committee intends that the advisory committee carry out detailed reviews of the HPC and applications programs and, on that basis, provide the Director and Congress with assessments of the progress toward achieving program goals and recommendations on ways to strengthen the program. The Committee views the requirement for the advisory committee to take public testimony on the HPC and applications programs annually as an important means for opening the programs to greater public scrutiny and for obtaining from the public a brad range of recommendations for improvements.

The Committee expects the Director to ensure that the recommendations of the advisory committee are considered fully during the process of preparing the plan for the applications program in accordance with section 302.

NATIONAL RESEARCH AND EDUCATION NETWORK AMENDMENTS

Section 5 of the amendment modifies section 102 of the HPC Act of 1991 which establishes the National Research and Education Network (NREN). The amendment redefines NREN as the NREN program in order to clarify the federal role in developing high-performance networks and in supporting the research and education communities in the use of networks. The NREN program has three components: (1) R&D necessary to achieve gigabit data networks, (2) federal experimental test bed networks to support development and demonstration of new networking technologies, and to provide connections and network services for applications requiring levels of network capabilities not commercially available, and (3) federal support for access to and use of the Internet by the research and education communities.

The Committee intends that federal experimental test bed networks be networks for the transmission of information which obtain federal funding support and which are operated under the policy control of a federal agency or agencies. Section 102(a)(2)(A) specifies that the development and demonstration of new networking technologies carried out on federal experimental test bed networks may include any reasonably necessary assessment of the reliability of such technologies under realistic operating conditions. However, the Committee expects that federal agencies supporting the test bed networks will take into account testing of new technologies which may be conducted by commercial network providers on their production networks and will not unnecessarily duplicate reliability testing on the test bed networks.

Section 102(d) of the amendment restricts use of the federal experimental test bed networks by the research and education communities for purposes other than those specified in section 102(a)(2). The restriction is imposed only if commercially available network services could be provided satisfactorily. Among factors to be considered by federal agencies having control of access to federal bed networks in determining "satisfactory availability" of commer-

cial services is the affordability of service. The Committee intends that federal agencies assess affordability on the basis of the differential between the cost to the government of providing for the transmission of electronic traffic generated by a particular network user by (1) routing such traffic over a test bed network or (2) funding the purchase by the user, or the user's institution, of commercial network services to replace use of the test bed network. In determining the cost to the government of routing electronic traffic over the test bed network, the entire cost of the test bed network should be fully allocated on a proportional basis to all traffic carried by the test bed network. Once the cost is determined, the comparison should be made only for the portion of the cost of commercial service associated with replacing the test bed network segment of the transmission pathway with a commercial alternative. If the additional cost of the commercial service is 125 percent or less of the cost to the government associated with providing use of a test bed network, then the commercial service may be considered to be affordable for the purpose of determining "satisfactory availability" under section 102(d)(1).

The Committee anticipates that implementation of section 102(a)(3) of the amendment will provide a major source of federal support for network access and use by the research and education communities. This section directs that federal support be provided for researchers, educators and students for access to and use of the Internet for purposes consistent with the Act. The Committee intends that federal funds provided for Internet access and use be provided directly to specified types of network users, to research or educational institutions with which the users are affiliated, or to organizations acting on behalf of users or the users' institutions, which have responsibilities for purchasing network services.

Section 102(h) of the amendment states the requirement that funds made available under the Act for development of data communications networks be through purchase of standard commercial transmission and network services whenever feasible. The Committee intends that this provision will involve the purchase of commercial transmission and network services which are made available using the commercial provider's network. In assessing the feasibility of purchasing standard commercial transmission and network services to support specific projects under the Act, federal funding agencies should consider the availability and cost of commercial services at the location where the project is being undertaken, and the timeliness and adequacy of the technical performance standards of the commercial offeror of the services. The Committee anticipates that the requirement for use of standard commercial services will encourage the further development of such services in a competitive marketplace, and expects standard commercial services to be used unless shown, in a formal evaluation process using the preceding criteria, not to meet the requirements of a particular project.

The Committee anticipates that purchase of standard commercial transmission and network services for federal experimental test bed networks would be unusual, since the purpose of such networks is to develop and demonstrate leading edge networking technologies. The Committee expects, as has been the case for develop-

ment of federal networks to date, that test bed networks will be developed in close collaboration with industry and will utilize, to the maximum extent, physical network infrastructure owned by the private sector.

If use of standard commercial services is not feasible for a particular project supported under the Act, federal agencies are authorized to provide funds for customized services, which may involve purchase or lease of transmission facilities, and purchase or lease of routers and other necessary hardward to form a new network. The Committee intends that a network established in connection with a project awarded under this Act be used for the purposes set forth in the proposal on which the award is based and that the network not be made available for a fee for uses unconnected with the award. The Committee understands that the development of a federal test bed network may be accomplished by means of a logical, software-defined separation of the physical networking facilities of a commercial network provider rather than by building a physically separate network. Consequently, the Committee does not intend that any restrictions on network use apply to a commercial network provider's physical network facilities which are logically separated with software partitions from a federal experimental test bed network.

IV. Sectional Analysis of H.R. 1757, as Reported

A bill to provide for a coordinated federal program to accelerate development and dissemination of applications of high-performance computing and high-speed networking, and for other purposes.

Section 1 is the title of the bill, the "National Information Infrastructure Act of 1993."

Section 2 contains the findings of the bill. The opportunities and benefits to society are cited as developing applications of computing and networking technologies resulting from the R&D activities under the High-Performance Computing Act of 1991. The need is expressed for a coordinated, interagency program to develop such applications for the benefit of society.

Section 3 amends the High-Performance Computing (HPC) Act of 1991 by adding a new Title III having the following sections:

Section 301. Establishment of Applications Program. The Director of the Office of Science and Technology Policy (OSTP), through the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), is charged to establish an interagency program to develop applications of computing and networking technologies for education, libraries, health care, the provision of government information, and other appropriate fields. The program is required to focus on applications accessible and usable by all citizens, and a plan is required which establishes the goals and proposed activities under the program. The President designates the federal agencies which will participate in the applications program.

The applications program is required to involve cost sharing and partnerships among participating federal agencies, State and local governments, and the private sector. The participating federal agencies are directed to (1) give special consideration to promoting interconnected and interoperable informa-

tion systems in selecting awards under the applications program, and (2) purchase items of supply available in the commercial marketplace whenever possible in carrying out activities under the Act.

Section 302. Plan for Computing and Networking Applications. The five-year applications plan must specify program priorities and goals, agency responsibilities, and funding levels by goal and by agency. Each biennial submission of the plan to Congress must include a summary of accomplishments, and evaluation of progress and problems, and recommendations for needed congressional assistance in implementing the plan.

Section 303. Responsibilities of the FCCSET. The FCCSET is responsible for development of the applications plan, for coordination of the applications program, and for providing OMB, prior to release of the President's budget request, with an assessment of the consistency with the plan of each participating agency's budget estimate.

Section 304. Notification Requirement. Each agency participating in the applications program is required to identify for OMB at the time of submittal of its budget request those portions of its budget that are included in the plan or that help support the goals of the plan. OMB is required to review the agency submissions in light of the applications plan and to indicate in the President's budget request the portion of each agency's request that supports the plan.

Section 305. Network Access. As part of the plan, the National Science Foundation (NSF) is tasked to assist, on the basis of cost sharing, educational institutions at all levels, libraries, museums, and State and local governments to interconnect and to connect to the Internet. In addition, instructional programs are authorized to train teachers, students, librarians, and local government personnel in the use of computer networks and the Internet, in particular. Finally, the OSTP Director is required to provide a report to Congress of an examination of the level of connectivity of schools, libraries, and State and local government offices to the Internet, an estimate of the cost of universal access, and recommendations for ways to expand connectivity.

A three-authorization is provided for NSF from sums otherwise authorized: $15 million for FY 1994, $30 million for FY 1995, and $50 million for FY 1996.

Section 306. Research in Support of Applications. The plan is required to specify research activities to address issues underlying all of the computing and networking applications being developed, including research activities in the social sciences. The plan must address research needed to provide the means to assure network security and privacy, including the management and protection of copyrighted information, and research to develop and demonstrate user-friendly network interfaces.

A five-year authorization is provided from sums otherwise authorized: $6 million for FY 1994, $15 million for FY 1995, $20 million for FY 1996, $20 million for FY 1997, and $20 million for FY 1998.

Section 307. Applications for Education. The plan is required to specify applications for education at all levels. Activities under the plan must include: projects to demonstrate the educational uses of the Internet; development of hardware systems, software and networks for teacher training and informal education; and development of educational software.

The plan is required to include projects which address K–12 education and which strengthen ongoing educational reform activities. Authorized projects include: provision for connections among schools in local regions and for connection to the Internet, addressing the needs of both rural and urban areas; collection and dissemination of effective educational programs available via the Internet; development of undergraduate courses on educational applications of computing and networking for teachers in training; and development of educational software designed for collaborative use over the Internet.

A five-year authorization is provided for NSF from sums otherwise authorized: $16 million for FY 1994, $45 million for FY 1995, $60 million for FY 1996, $75 million for FY 1997, and $75 million for FY 1998.

Section 308. Applications for Health Care. The plan is required to specify applications which will improve the quality and enhance the cost-effectiveness of health care. Special consideration must be given to applications designed to lower health care costs. In the area of clinical information systems, authorized projects include: test bed networks to link health providers in a variety of settings to enable sharing of medical images and records; development of technologies to manipulate and use diagnostic images and records, and basic research leading to new technologies with clinical uses, such as virtual reality; and development of database technology for better access to medical information.

To provide health information to the public, projects are authorized to: develop network and database technologies for distribution of interactive health promotion information; establish pilot programs to develop and to assess the effectiveness and cost efficiency of interactive materials to assist patients in deciding among health care options; develop user-friendly human/computer interfaces for non-specialists in computer technology; and develop technologies to provide individuals with customized health information.

Finally, projects are authorized to develop test bed networks and collaborative technology (1) to enable health and human service providers to work together in delivering coordinated care for at-risk populations, (2) to enable health care providers to obtain on-line access to health promotion and disease prevention recommendations from Public Health Service agencies, and (3) to guide and assist clinicians in providing treatment and advice to patients and to facilitate gathering population data sets on the efficacy of treatments and on national health trends.

A five-year authorization is provided for HHS from sums otherwise authorized: $22 million for FY 1994, $54 million for

FY 1995, $72 million for FY 1996, $90 million for FY 1997, and $90 million for FY 1998.

Section 309. Applications for Libraries. The plan is required to specify projects that will allow for development of digital libraries of electronic information. Specific projects authorized include development of ways to accurately digitize, organize and store large quantities of electronic information, including development of software for searching and manipulating such digital libraries; and development of user-friendly technologies, and associated training of users, for use of networked digital libraries.

Prototype digital libraries, providing public access via the Internet, are to be developed to serve as test beds for the concepts and methods authorized under this section. These prototypes are to serve as assessment tools in the utility and value of digital libraries and of the technologies available for using them. Finally, NASA is required to develop databases of software and remote-sensing images to be made available via the Internet.

A five-year authorization is provided for NSF from sums otherwise authorized: $8 million for FY 1994, $16 million for FY 1995, $22 million for FY 1996, $32 million for FY 1997, and $32 million for FY 1998. A five-year authorization is provided for NASA from sums otherwise authorized: $4 million for FY 1994, $8 million for FY 1995, $10 million for FY 1996, $12 million for FY 1997, and $12 million for FY 1998.

Section 310. Applications for Government Information. The plan is required to specify applications to provide improved public access to information generated by Federal, State and local governments. The President is required to designate a lead agency for implementing this part of the plan and for issuing policy guidelines for federal activities. Projects are authorized to connect depository libraries and other sources of government information to the Internet and to demonstrate technologies to facilitate use of government information to support research and education, economic development, and an informed citizenry. A specific requirement is included to establish an inventory/locator system for federal information accessible via the Internet.

A five-year authorization is provided from sums otherwise authorized: $4 million for FY 1994, $12 million for FY 1995, $16 million for FY 1996, $21 million for FY 1997, and $21 million for FY 1998.

Section 4 amends subsection 101(b) of the HPC Act of 1991, which establishes an advisory committee for the HPC Program. The amendment assigns the responsibility for appointing the advisory committee to the OSTP Director and broadens the scope of the committee to encompass the applications activities authorized by the new Title III. The membership of the committee is expanded to include representation from all parts of the education community, from consumer and public interest groups, and from computer hardware, computer software, telecommunications, publishing and information industries.

The advisory committee is required to meet at least annually for the purpose of receiving public testimony on the planning and implementation of the applications program and to provide an annual report to the OSTP Director and Congress on its findings and recommendations.

Section 5 amends section 102 of the HPC Act of 1991, which establishes the National Research and Education Network (NREN), in order to define a revised NREN Program having three components: (1) research and development of networking software and hardware required for achieving gigabit data transmission rates, (2) experimental test bed networks to develop and demonstrate advanced networking technologies and to support applications requiring levels of network capabilities not commercially available, and (3) provision of support for researchers, educators and students to obtain access to and use of the Internet for purposes consistent with the Act. Reports to Congress are required which specify a plan for achieving the goals of component (3) defined above, and which describe annual progress toward implementation of the plan.

Use of experimental test bed networks for purposes other than those specified under (1) and (2) above is prohibited if satisfactory commercial network services are available. This prohibition becomes effective on the earliest date on which implementation is technically feasible. The OSTP Director is required to specify the date in a report to Congress.

A provision is added to require that data communications networks developed under the Act be through purchase of standard commercial services whenever feasible in order to minimize federal investment in network hardware and software.

Section 6 requires that the Competition in Contracting Act apply to all procurements under the HPC Act of $25,000 or greater.

Section 7 contains conforming amendments to the HPC Act of 1991.

Section 8 contains a prohibition against the fraudulent use of "Made in America" labels; a requirement that procurements under the HPC Act be in compliance with the Buy American Act; and a sense of Congress provision that funds expended under the HPC Act should favor purchase of American made equipment and products.

V. Committee Views

1. MANAGEMENT OF THE APPLICATIONS PROGRAM

Background

The HPC Act of 1991 established a process through which federal R&D agencies plan and coordinate activities under the High-Performance Computing Program. The Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) is the forum for the agency interactions. The Director of the Office of Science and Technology Policy (OSTP), who chairs FCCSET, is assigned the responsibility to provide for interagency coordination of the HPC Program and to provide the Congress with annual reports describing the implementation of the HPC Program. However, actual implementation of the HPC Program is accomplished through the

activities of the separate agencies which are identified in the HPC Program plan.

The planning and implementation of the applications program established by section 301 of the bill is patterned on the mechanisms put in place by the 1991 Act. One difference is that the role of the OSTP Director is given more prominence by specifying that the Director is required to establish the coordinated interagency applications program and to develop the applications program plan.

The HPC Program has been criticized for a lack of strong central management control since no one agency is given responsibility to implement the Program and to ensure that the Program goals are achieved. The Bush Administration responded to this criticism by creating a National Coordination Office for the HPC Program. The director of the Coordination Office was created as a part-time position and was assigned to an individual at any agency participating in the HPC Program, rather than to an individual on the OSTP staff. While not having budgetary control of the Program, the director of the Coordination Office was assigned the responsibility to be the chairman of the FCCSET subcommittee that prepares the HPC Program plan and to be the point of contact for the public and Congress for information about the HPC Program.

Committee view

The Committee emphasizes the role of OSTP in convening the federal agencies to prepare the plan for the applications program, in ensuring that the agencies' activities are fully coordinated, and in keeping Congress informed about the status and progress of the applications program. In addition, the Committee expects OSTP to monitor the agencies' activities sufficiently to ensure conformity to the applications program plan, as well as to the HPC Program plan. The Committee strongly recommends that OSTP use the Coordination Office for the HPC Program and request assistance from the high-performance computing and applications advisory committee, established by section 4 of the bill, to assist with monitoring the agencies' activities.

The Committee expects that, in complying with section 302(c) of the bill, the OSTP Director will report to Congress on any activities carried out by agencies using funds identified as part of the applications program which do not conform to the goals and priorities specified in the plan for the applications program.

In order to establish confidence on the part of the public and Congress that the decentralized HPC and applications programs are being managed effectively, it is important that information about the two programs be readily available. To that end, the Committee recommends that the Coordination Office for the HPC Program maintain and disseminate the following kinds of information regarding the HPC Program and the applications program: (1) abstracts for projects supported by each participating agency, including project funding levels, periods of support, and principal participants; (2) names of points of contact at each participating agency; (3) breakouts of funding for the programs by major budget category within each participating agency's budget, including the level of funding available for new awards for the current fiscal year; and

(4) announcements of current requests for proposals issued by all participating agencies.

2. NETWORKING TECHNOLOGIES FOR SUPPORT OF APPLICATIONS

Committee view

The Committee intends that any project which involves the use of computer networks and which is part of the applications program authorized by section 3 of the bill make use of those networking technologies which are best suited to achieve the intended objective. The Committee expects that federal agencies which implement the bill will support projects which take advantage of proven networking technologies, as well as networking technologies at the leading edge of current capabilities.

The bill does not specify the use of wire or wireless technologies nor the use of packet switched or circuit switched networks for any activity authorized. The bill provides for support of projects that require the use of broadband networks, but the bill does not require that every application be based on the use of broadband networks, as defined by the bill. Although the Committee anticipates that access to the Internet will be needed for many projects because of the wide connectivity to the Internet that now exists among the research and education communities, the bill imposes no requirement that the Internet must be employed for projects involving linkages between widely separated sites. The Committee expects that, in evaluating projects for support, agencies will consider the tradeoff between the cost and capabilities of alternative networking technologies and will require that the most appropriate technologies be used for each project.

3. THE HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE

Background

The HPC Act of 1991 established a non-governmental advisory committee to provide the OSTP Director with an independent assessment of the HPC Program, including progress in implementation, need for revisions, and balance among components. The advisory committee was viewed by the Committee as an important mechanism in the planning and implementation of the HPC Program for obtaining the expertise of non-federal scientists and engineers and for incorporating the views of groups which will be R&D performers, suppliers of services, and users of networks. Unfortunately, members of the advisory committee have not been appointed nor the committee instituted to date.

The bill amends section 101(b) of the HPC Act of 1991, which establish the advisory committee for the HPC Program, in order to expand the role of the committee to cover both the HPC Program and the applications program authorized by section 3 of the bill. The OSTP Director, rather than the President, is assigned the responsibility by the bill to appoint committee members.

Committee view

The Committee strongly believes that the advisory committee is essential to ensure the success of both the HPC Program and the

applications program and expects the OSTP Director to move expeditiously to appoint members to the committee so that it may begin to function without additional delay. The Committee requests that the Director appoint members to the committee within 6 months of enactment of the bill.

The Committee emphasizes that the recommendations of the advisory committee must be taken into consideration during the process for developing and updating the plans for the HPC and applications programs. In the annual report to Congress required by section 101(b)(2), the Committee expects the advisory committee to document its recommendations to the OSTP Director on the subjects defined in subparagraphs (A) through (F) of section 101(b)(1).

4. SUPPORT FOR TRAINING

Committee view

The applications of computing and networking authorized by section 3 of the bill are focused on individuals who in many cases will be unsophisticated in the use of the technologies involved. The Committee emphasizes that the plan for the applications program should include projects to develop user-friendly computer interfaces. Agencies participating in the applications programs should give special consideration to projects which include training components. The connections program [Sec. 305] requires that training in use of networks accompany support for network connections.

Also, the Committee notes that some projects addressing applications authorized by the bill will take advantage of the powerful new generation of parallel computers. For the full potential of this class of computers to be achieved, a significant increase is needed in the number of software programmers trained to program parallel computers. The Committee recommends that the agencies participating in activities under the HPC Act of 1991, as amended by the bill, provide assistance to and encourage colleges and universities to develop parallel programming course work requirements for all science and engineering disciplines.

VI. LEGISLATIVE HISTORY

During the 2nd Session of the 102nd Congress, Representative George Brown, Jr. introduced H.R. 5759, the Information Infrastructure and Technology Act of 1992, which was a companion to S. 2937 introduced by Senator Albert Gore. No action was taken on either bill prior to adjournment of the 102nd Congress. The broad objectives and some specific provisions of the bills are similar to H.R. 1757.

In the 103rd Congress, Representative Rick Boucher introduced H.R. 1757, the High-Performance Computing and High-Speed Networking Applications Act of 1993 on April 21, 1993. The bill was referred solely to the Committee on Science, Space, and Technology. Hearings were held on the bill by the Science Subcommittee on April 27, May 6, and May 11, 1993. An amendment in the nature of a substitute was adopted and ordered reported by voice vote on June 30, 1993 (see Committee Actions).

On January 21, 1993, Senator Hollings introduced S. 4, the National Competitiveness Act of 1993. Title VI of S. 4, as introduced,

contains the text of S. 2937, which was introduced in the 102nd Congress. On May 25, 1993, the Senate Commerce, Science and Transportation Committee ordered S. 4 reported, including amendments to title VI.

VII. Committee Oversight Findings and Recommendations

Pursuant to Rule XI, clause 2(l)(3) of the Rules of the House of Representatives, under the authority of Rule X, clause 2(b)(1) and clause 3(f), the Committee's oversight findings and conclusions are reflected in the recommendations found in the present bill and report.

VIII. Oversight Findings and Recommendations by the Committee on Government Operations

No statement of findings and recommendations on oversight activity pursuant to Rule X, clause 2(b)(2), and Rule XI, clause 2(l)(3), of the Rules of the House of Representatives, have been submitted by the Committee on Government Operations for inclusion in this report.

IX. Congressional Budget Office Cost Estimate

U.S. Congress,
Congressional Budget Office,
Washington, DC, July 9, 1993.

Hon. George E. Brown, Jr.,
Chairman, Committee on Science, Space, and Technology,
U.S. House of Representatives, Washington, DC.

Dear Mr. Chairman: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 1757, the National Information Infrastructure Act of 1993.

Enactment of H.R. 1757 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

Robert D. Reischauer, *Director.*

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

1. Bill number: H.R. 1757.
2. Bill title: National Information Infrastructure Act of 1993.
3. Bill status: As ordered reported by the House Committee on Science, Space, and Technology on June 30, 1993.
4. Bill purpose: H.R. 1757 would provide for an interagency federal program to encourage development of applications of high-performance computing and high-speed networking. The Office of Science and Technology Policy, through the Federal Coordinating Council for Science, Engineering, and Technology, would coordinate the program. The bill would authorize:

> $15 million for fiscal year 1994, $30 million for fiscal year 1995, and $50 million for fiscal year 1996 to the National Science Foundation (NSF) for a local network access program;

$16 million for 1994, $45 million for 1995, $60 million for 1996, and $75 million for each of the years 1997 and 1998 to NSF for education applications;

$8 million for 1994, $16 million for 1995, $22 million for 1996, and $32 million for each of the years 1997 and 1998 to NSF for library database applications;

$4 million for 1994, $8 million for 1995, $10 million for 1996, and $12 million for each of the years 1997 and 1998 to the National Aeronautics and Space Administration (NASA) for library applications, including developing databases of software and remote-sensing images; and

$22 million for 1994, $54 million for 1995, $72 million for 1996, and $90 million for each of the years 1997 and 1998 to the Department of Health and Human Services for health care applications;

$6 million for 1994, $15 million for 1995, and $20 million for each of the years 1996 through 1998 to unspecified agencies for research activities;

$4 million for 1994, $12 million for 1995, $16 million for 1996, and $21 million for each years 1997 and 1998 to unspecified agencies for a program to improve access to government information.

The bill also would amend the High-Performance Computing Act of 1991 to reduce the 1994 authorization for the Department of Energy from $138 million to $124 million.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1994	1995	1996	1997	1998
Authorizations of Appropriations:					
National Science Foundation	39	91	132	107	107
National Aeronautics and Space Administration	(1)	8	10	12	12
Department of Health and Human Services	22	54	72	90	90
Unspecified Agencies	10	27	36	41	41
Department of Energy	−14	.....	.....	.....	.....
Authorization level	57	180	250	250	250
Estimated outlays	21	103	190	233	246

[1] The bill would not affect NASA's existing authorization for 1994.

The costs of this bill would fall primarily within budget functions 250 and 550.

Basis of Estimate: The authorization for NASA funding in 1994 has already been enacted (in Public Law 102–195), and H.R. 1757 would not change this total amount. Otherwise, authorizations for NASA, NSF, and the Department of Health and Human Services have not been enacted for any of the fiscal years 1994 through 1989. For these other authorizations, we have assumed that the full amounts authorized in this bill would be appropriated for each fiscal year. The estimated outlays are based on historical spending patterns for similar activities.

6. Pay-as-you-go considerations: The Budget Enforcement Act of 1990 sets up pay-as-you-go procedures for legislation affecting direct spending or receipts through 1995. CBO estimates that enactment of H.R. 1757 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

7. Estimated cost to state and local governments: The amounts authorized to NSF for the local network access program would be used to make grants to state and local governments, public and private schools, and libraries and museums. Grant recipients would be required to fund at least 25 percent of the cost of the projects for which the grants are intended. We estimate that the resultant costs to state and local governments would range from $2 million to $10 million annually over the fiscal years 1994 to 1998.

8. Estimate comparison: None.

9. Previous CBO estimate: None.

10. Estimate prepared by: Mark Grabowicz.

11. Estimate approved by: Paul Van de Water, for C.G. Nuckols, Assistant Director for Budget Analysis.

X. Impact of Inflation

In accordance with Rule XI, clause 2(l)(4), of the Rules of the House of Representatives, this legislation is assessed to have no adverse inflationary effect on prices and costs in the operation of the national economy.

XI. Committee Recommendation

A quorum being present, the bill was ordered reported on June 30, 1993 by a voice vote of the Committee.

XII. Changes in Existing Law Made by the Bill, as Reported

In compliance with clause 3 of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italics, existing law in which no change is proposed is shown in roman):

HIGH-PERFORMANCE COMPUTING ACT OF 1991

* * * * * * *

SEC. 3. PURPOSE.

The purpose of this Act is to help ensure the continued leadership of the United States in high-performance computing and its applications by—

(1) expanding Federal support for research, development, and application of high-performance computing in order to—

[(A) establish a high-capacity and high-speed National Research and Education Network;]

(A) accelerate progress toward a universally accessible high-capacity and high-speed data network for the Nation;

* * * * * * *

(C) promote the further development of an information infrastructure of data bases, services, access mechanisms, and research facilities available for use through the [Network] *Internet*;

* * * * * * *

SEC. 4. DEFINITIONS.

As used in this Act, the term—

(1) "broadband" means a transmission rate for digital information on a communications network which exceeds the maximum rate possible for transmission of digital information on normal copper telephone wires;

[(1)**]** *(2)* "Director" means the Director of the Office of Science and Technology Policy;

(3) "disabilities" means functional limitations of hearing, vision, movement, manipulation, speech, and interpretation of information;

(4) "educational institutions" includes institutions of early childhood education, elementary and secondary education, postsecondary education, and vocational/technical education;

(5) "education at all levels" includes early childhood education, elementary and secondary education, postsecondary education, and vocational/technical education;

(6) "Federal test bed networks" means the Federal experimental test bed networks described in section 102(a)(2);

[(2)**]** *(7)* "Grand Challenge" means a fundamental problem in science or engineering, with broad economic and scientific impact, whose solution will require the application of high-performance computing resources;

[(3)**]** *(8)* "high-performance computing" means advanced computing, communications, and information technologies, including scientific workstations, supercomputer systems (including vector supercomputers and large scale parallel systems), high-capacity and high-speed networks, special purpose and experimental systems, and applications and systems software;

[(4) "Network" means a computer network referred to as the National Research and Education Network established under section 102; and**]**

(9) "Internet" means the network of both Federal and non-Federal interoperable packet switched data networks;

(10) "Network Program" means the National Research and Education Network Program established under section 102;

(11) "Nondevelopmental item" has the meaning given such term in section 2325(d) of title 10, United States Code; and

[(5)**]** *(12)* "Program" means the National High-Performance Computing Program described in section 101.

TITLE I—HIGH-PERFORMANCE COMPUTING AND THE NATIONAL RESEARCH AND EDUCATION NETWORK

SEC. 101. NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM.

(a) NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM.—

(1) * * *

(2) The Program shall—

(A) provide for the establishment of policies for management and access to the **[**Network**]** *Federal test bed networks*;

(B) provide for oversight of the operation and evolution of the **[**Network**]** *Federal test bed networks*;

(C) promote connectivity among computer networks of *the private sector, States, and* Federal agencies and departments;

* * * * * * *

(4) The annual report submitted under paragraph (3)(A) shall—

(A) * * *

* * * * * * *

(C) describe the levels of Federal funding for the fiscal year during which such report is submitted, and the levels proposed for the fiscal year with respect to which the budget submission applies, for specific activities, including education, research, hardware and software development, and support for the [establishment of the Network] *Network Program*;

* * * * * * *

[(b) HIGH-PERFORMANCE COMPUTING ADVISORY COMMITTEE.—The President shall establish an advisory committee on high-performance computing consisting of non-Federal members, including representatives of the research, education, and library communities, network providers, and industry, who are specially qualified to provide the Director with advice and information on high-performance computing. The recommendations of the advisory committee shall be considered in reviewing and revising the Program. The advisory committee shall provide the Director with an independent assessment of—

[(1) progress made in implementing the Program;

[(2) the need to revise the Program;

[(3) the balance between the components of the Program;

[(4) whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in computing technology; and

[(5) other issues identified by the Director.]

(b) HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE.—(1) The Director shall establish an advisory committee on high-performance computing and applications consisting of non-Federal members, including representatives of the research and library communities, education at all levels, consumer and public interest groups, network providers, and the computer hardware, computer software, telecommunications, publishing, and information industries, who are specially qualified to provide the Director with advice and information on high-performance computing and on applications of computing and networking. The recommendations of the advisory committee shall be considered in reviewing and revising the Program described in this section and the Plan required by section 301(a)(2). The advisory committee shall provide the Director with an independent assessment of—

(A) progress in implementing the Program described in this section and the Plan required by section 301(a)(2);

(B) the need to revise the Program described in this section and the Plan required by section 301(a)(2);

(C) the balance between the components of the activities undertaken pursuant to this Act;

(D) whether the research, development and demonstration projects undertaken pursuant to this Act are—

(i) helping to maintain United States leadership in computing and networking technologies and in the application of those technologies; and

(ii) promoting competitive private sector markets in the provision of products and services related to these technologies and their applications;

(E) whether the applications developed under title III are successfully addressing the needs of the targeted populations, including assessment of the number of users served by those applications; and

(F) other issues identified by the Director.

(2) The advisory committee established under paragraph (1) shall meet not less than once annually, following notice in the Federal Register, for the purpose of receiving oral and written public testimony on the subjects identified in subparagraphs (A) through (F) of paragraph (1). The advisory committee shall compile and submit an annual report to the Director and to the Congress containing the findings and recommendations required under this subsection and summarizing the public testimony received. In addition, the advisory committee may meet periodically as determined by its members.

(3) The Director shall provide such support as is required to allow the advisory committee established under paragraph (1) to meet and to carry out the responsibilities assigned by this subsection.

* * * * * * *

[SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK.

[(a) ESTABLISHMENT.—As part of the Program, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, and other agencies participating in the Program shall support the establishment of the National Research and Education Network, portions of which shall, to the extent technically feasible, be capable of transmitting data at one gigabit per second or greater by 1996. The Network shall provide for the linkage of research institutions and educational institutions, government, and industry in every State.

[(b) ACCESS.—Federal agencies and departments shall work with private network service providers, State and local agencies, libraries, educational institutions and organizations, and others, as appropriate, in order to ensure that the researchers, educators, and students have access, as appropriate, to the Network. The Network is to provide users with appropriate access to high-performance computing systems, electronic information resources, other research facilities, and libraries. The Network shall provide access, to the extent practicable, to electronic information resources maintained by libraries, research facilities, publishers, and affiliated organizations.

[(c) NETWORK CHARACTERISTICS.—The Network shall—

[(1) be developed and deployed with the computer, telecommunications, and information industries;

[(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

[(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

[(4) be designed, developed, and operated in a manner which promotes research and development leading to development of commercial data communications and telecommunications standards, whose development will encourage the establishment of privately operated high-speed commercial networks;

[(5) be designed and operated so as to ensure the continued application of laws that provide network and information resources security measures, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

[(6) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the Network and, where appropriate and technically feasible, for their usage of the Network;

[(7) ensure the interoperability of Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network;

[(8) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware;

[(9) support research and development of networking software and hardware; and

[(10) serve as a test bed for further research and development of high-capacity and high-speed computing networks and demonstrate how advanced computers, high-capacity and high-speed computing networks, and data bases can improve the national information infrastructure.

[(d) DEFENSE ADVANCED RESEARCH PROJECTS AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Defense Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network.

[(e) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Network. These services may include the provision of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, access to commercial information services for users of the Network, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

[(f) USE OF GRANT FUNDS.—All Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

[(g) REPORT TO CONGRESS.—Within one year after the date of enactment of this Act, the Director shall report to the Congress on—

[(1) effective mechanisms for providing operating funds for the maintenance and use of the Network, including user fees, industry support, and continued Federal investment;

[(2) the future operation and evolution of the Network;

[(3) how commercial information service providers could be charged for access to the Network, and how Network users could be charged for such commercial information services;

[(4) the technological feasibility of allowing commercial information service providers to use the Network and other federally funded research networks;

[(5) how to protect the copyrights of material distributed over the Network; and

[(6) appropriate policies to ensure the security of resources available on the Network and to protect the privacy of users of networks.]

SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK PROGRAM.

(a) ESTABLISHMENT.—As part of the Program described in section 101, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, the Department of Education, and other agencies participating in the Program shall support the establishment of the National Research and Education Network Program. The Network Program shall consist of the following components:

(1) Research and development of networking software and hardware required for developing high-performance data networking capabilities with the goal of achieving the transmission of data at a speed of one gigabit per second or greater.

(2) Federal experimental test bed networks for—

(A) developing and demonstrating advanced networking technologies resulting from the activities described in paragraph (1), including any reasonably necessary assessment of the reliability of such technologies under realistic operating conditions; and

(B) providing connections and associated network services for purposes consistent with this Act which require levels of network capabilities not commercially available.

(3) Provision of support for researchers, educators, and students to obtain access to and use of the Internet to allow for communication with other individuals in the research and education communities and to allow for access to high-performance computing systems, electronic information resources, other research facilities, and libraries.

(b) TEST BED NETWORK CHARACTERISTICS.—The test bed networks shall—

(1) be developed and deployed in coordination with the computer hardware, computer software, telecommunications, and information industries;

(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment

in high-speed data networking within the telecommunications industry;

(4) be designed and operated in a manner which promotes and encourages research and development leading to the creation of commercial data transmission standards, enabling the establishment of privately developed high-speed commercial networks;

(5) be designed and operated so as to ensure the application of laws that provide network and information resources security, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

(6) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the test bed networks and, where appropriate and technically feasible, for their usage of the test bed networks; and

(7) be interoperable with Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network.

(c) NETWORK ACCESS.—The Federal agencies and departments participating in activities under this section shall develop a plan with specific goals for implementing the requirements of subsection (a)(3), including provision for financial assistance to educational institutions, public libraries, and other appropriate entities. This plan shall be submitted to the Congress not later than one year after the date of enactment of the National Information Infrastructure Act of 1993. Each year thereafter, the Director shall report to Congress on progress in implementing subsection (a)(3).

(d) RESTRICTION ON USE OF TEST BED NETWORKS.—(1) The Federal test bed networks shall not be used to provide network services that are not related to the activities under paragraphs (1) and (2) of subsection (a) and that could otherwise be provided satisfactorily using commercially available network services. Determination of satisfactory availability shall include consideration of geographic access to and affordability of service, and timeliness and technical performance standards in providing services.

(2) The requirements of paragraph (1) shall take effect on the date set forth in the report required under paragraph (3).

(3) Six months following the date of enactment of the National Information Infrastructure Act of 1993, the Director, after consultation with the Federal agencies and departments supporting Federal test bed networks, shall provide a report to Congress which—

(A) describes the technical developments necessary to allow implementation of paragraph (1);

(B) determines the earliest feasible date for implementing paragraph (1); and

(C) sets forth that date as the date on which paragraph (1) shall take effect.

Should the Director subsequently determine that, for technical reasons, the requirements of paragraph (1) can not be imposed on that date, the Director shall, not less than 3 months prior to that date, report to Congress on the reasons for the delay in imposing the re-

quirements of paragraph (1), and shall set forth a new date on which paragraph (1) shall take effect.

(e) ADVANCED RESEARCH PROJECTS AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network Program.

(f) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Internet consistent with the purposes of this Act. These services may include the provision of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

(g) USE OF GRANT FUNDS.—All Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

(h) LIMITATION ON USE OF FUNDS.—Development of data communications networks pursuant to this Act shall be through purchase of standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when such purchase is not feasible, in order to minimize Federal investment in network hardware and software.

TITLE II—AGENCY ACTIVITIES

SEC. 201. NATIONAL SCIENCE FOUNDATION ACTIVITIES.

(a) GENERAL RESPONSIBILITIES.—As part of the Program described in title I—

(1) * * *

(2) to the extent that colleges, universities, and libraries cannot connect to the **[**Network**]** *Internet* with the assistance of the private sector, the National Science Foundation shall have primary responsibility for assisting colleges, universities, and libraries to connect to the **[**Network**]** *Internet*;

(3) the National Science Foundation shall serve as the primary source of information on access to and use of the **[**Network**]** *Internet for the purposes of this Act*; and

(4) the National Science Foundation shall upgrade the National Science Foundation funded network, *consistent with section 102,* assist regional networks to upgrade their capabilities, and provide other Federal departments and agencies the opportunity to connect to the National Science Foundation funded network.

* * * * * * *

SEC. 202. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION ACTIVITIES.

(a) * * *

(b) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Aeronautics and Space Administration for

the purposes of the Program $72,000,000 for fiscal year 1992; $107,000,000 for fiscal year 1993; [$134,000,000] *$111,000,000* for fiscal year 1994; $151,000,000 for fiscal year 1995; and $145,000,000 for fiscal year 1996.

SEC. 203. DEPARTMENT OF ENERGY ACTIVITIES.

(a) * * *

* * * * * * *

(e) AUTHORIZATION OF APPROPRIATIONS.—(1) There are authorized to be appropriated to the Secretary of Energy for the purposes of the Program $93,000,000 for fiscal year 1992; $110,000,000 for fiscal year 1993; [$138,000,000] *$124,000,000* for fiscal year 1994: $157,000,000 for fiscal year 1995; and $169,000,000 for fiscal year 1996.

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SEC. 209. COMPETITIVE PROCUREMENTS.

The Competition in Contracting Act shall apply to all procurements under this Act of $25,000 or greater.

TITLE III—APPLICATIONS OF COMPUTING AND NETWORKING

SEC. 301. ESTABLISHMENT OF APPLICATIONS PROGRAM.

(a) ESTABLISHMENT.—The Director, through the Federal Coordinating Council for Science, Engineering, and Technology, shall, in accordance with this title—

(1) establish a coordinated interagency applications program to develop applications of computing and networking advances achieved under the Program described in section 101, that are designed to be accessible and usable by all persons in the United States, including historically underserved populations and individuals with disabilities, in the fields of education, libraries, health care, the provision of government information, and other appropriate fields; and

(2) develop a Plan for Computing and Networking Applications (hereafter in this title referred to as the "Plan") describing the goals and proposed activities of the applications program established under paragraph (1), taking into consideration the recommendations of the advisory committee on high-performance computing and applications established under section 101(b).

The President shall designate the Federal agencies and departments which shall participate in the applications program established under paragraph (1). The applications program may be administered as part of the Program established under section 101.

(b) COLLABORATION WITH NON-FEDERAL ENTITIES.—To the maximum extent possible, the applications program shall involve cost sharing and partnerships among participating Federal departments and agencies, State and local governments, and private sector entities.

(c) INTEROPERABLE INFORMATION SYSTEMS.— In selecting projects for support under this title, special consideration shall be given to projects which will promote development of interconnected and interoperable information systems.

(d) NONDEVELOPMENTAL ITEMS.—In carrying out activities under this Act, Federal departments and agencies shall purchase nondevelopmental items whenever possible.

SEC. 302. PLAN FOR COMPUTING AND NETWORKING APPLICATIONS.

(a) REQUIREMENT.—The Plan shall contain a statement of steps which should be taken to implement the applications program established under section 301(a)(1) for the fiscal year in which the Plan is submitted and the succeeding four fiscal years, and shall be submitted to the Congress within one year after the date of enactment of this title. The Plan shall be revised and resubmitted to the Congress at least once each two years thereafter.

(b) CONTENTS.—The Plan shall—

(1) establish the goals and priorities for the applications program established under section 301(a)(1), consistent with this Act;

(2) set forth the specific responsibilities of each Federal agency and department participating in the applications program established under section 301(a)(1) to achieve the goals and priorities established under paragraph (1) of this subsection; and

(3) describe the recommended levels of Federal funding required for each agency and department to carry out the specific responsibilities set forth in paragraph (2) of this subsection.

(c) PROGRESS IN IMPLEMENTING PLAN.—(1) Accompanying the initial submission of the Plan shall be—

(A) a summary of the achievements of Federal efforts during the preceding fiscal year to develop computing and networking applications and to advance the technologies on which the applications depend; and

(B) any recommendations regarding additional action or legislation which may be required to assist in implementing the Plan.

(2) Accompanying each subsequent submission of the Plan shall be—

(A) a summary of the achievements of Federal efforts since the previous submission of the Plan to develop computing and networking applications and to advance the technologies on which the applications depend, including an estimate of the number and the demographic diversity of users served in each application;

(B) an evaluation of the progress made toward achieving the goals and priorities established under subsection (b)(1);

(C) a summary of problems encountered in implementing the Plan; and

(D) any recommendations regarding additional action or legislation which may be required to assist in implementing the Plan.

SEC. 303. RESPONSIBILITIES OF THE FEDERAL COORDINATING COUNCIL FOR SCIENCE, ENGINEERING, AND TECHNOLOGY.

The Federal Coordinating Council for Science, Engineering, and Technology shall—

(1) develop the Plan as provided in section 301(a)(2);

(2) coordinate the activities of Federal agencies and departments undertaken pursuant to the Plan and report at least an-

nually to the President, through the Chairman of the Council, on any recommended changes in agency or departmental roles that are needed better to implement the Plan; and

(3) assess, prior to the President's submission to the Congress of the annual budget estimate, each agency and departmental budget estimate for consistency with the Plan and make the results of that assessment available to the appropriate elements of the Executive Office of the President, particularly the Office of Management and Budget.

SEC. 304. NOTIFICATION REQUIREMENT.

(a) REQUIREMENT.—Each Federal agency and department designated by the President under section 301(a) as a participant in the applications program shall, as part of its annual request for appropriations to the Office of Management and Budget—

(1) identify each element of its activities which—

(A) contributes primarily to the implementation of the Plan; or

(B) contributes primarily to the achievement of other objectives but aids Plan implementation in important ways; and

(2) identify the portion of its request for appropriations that is allocated to each such element.

(b) OFFICE OF MANAGEMENT AND BUDGET REVIEW.—The Office of Management and Budget shall review each submission received under this section in light of the goals, priorities, and agency and departmental responsibilities set forth in the Plan. The President's annual budget request shall include a statement of the portion of each appropriate agency or department's annual budget request that is allocated to efforts to achieve the goals and priorities established under section 302(b)(1).

SEC. 305. NETWORK ACCESS.

(a) CONNECTIONS PROGRAM.—The Plan shall include programs administered by the National Science Foundation to—

(1) foster the development of network services in local communities which will connect institutions of education at all levels, libraries, museums, and State and local governments to each other; and

(2) provide funds for the purchase of network services to entities described in paragraph (1), or organizations representing such entities, to connect to the Internet.

Such program shall include funding for the acquisition of required hardware and software and for the establishment of broadband connections to the Internet. Not more than 75 percent of the cost of any project for which an award is made under this subsection shall be provided under this Act.

(b) TRAINING.—The Plan shall include programs administered by the National Science Foundation and other appropriate agencies and departments to train teachers, students, librarians, and State and local government personnel in the use of computer networks and the Internet. Training programs for librarians shall be designed to provide skills and training materials needed by librarians to instruct the public in the use of hardware and software for accessing and using computer networks and the Internet. Training

programs shall include programs designed for individuals with disabilities.

(c) REPORT.—The Director shall, within one year after the date of enactment of this title, submit a report to Congress which shall include—

(1) findings of an examination of the extent to which the education and library communities and State and local government have access to the Internet, including the numbers and the geographic distribution, by type, of institutions having access, and including the numbers of institutions having human/computer interfaces suitable for use by individuals with disabilities;

(2) a statement of the extent to which broadband connections to the Internet exist for the education and library communities and State and local governments, including the numbers and the geographic distribution, by type, of institutions having access;

(3) an assessment of the factors limiting access by institutions of education at all levels, libraries, and State and local governments to the Internet and an estimate of the cost of providing universal broadband access for those institutions to the Internet; and

(4) recommendations for collaborative programs among Federal, State, and local governments and the private sector to expand connectivity to the Internet for educational institutions, libraries, and State and local governments.

(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of this section, $15,000,000 for fiscal year 1994, $30,000,000 for fiscal year 1995, and $50,000,000 for fiscal year 1996.

SEC. 306. RESEARCH IN SUPPORT OF APPLICATIONS.

(a) IN GENERAL.—The Plan shall specify the basic and applied research and human resource development activities in areas, such as computer science and engineering, mathematics, computer visualization, and human cognition, that will provide the foundation for achieving the applications included in the Plan. The Plan shall include basic and applied research activities related to the long-range social and ethical implications of applications of high-speed networking and high-performance computing. The Plan shall specify those activities included in the Program under title I which contribute to the development of applications included in the Plan.

(b) NETWORK SECURITY AND PRIVACY.—The Plan shall specify research programs needed to create means to—

(1) ensure the security and privacy of transmissions over the Internet and the integrity of digital information accessed via the Internet; and

(2) facilitate the management and protection of copyrighted information which is accessed via the Internet.

(c) EASE OF INTERNET USE.—The Plan shall specify research programs needed to develop and demonstrate human/computer interfaces that will simplify access to and use of the Internet by nonspecialists in computing and networking technologies and by individuals with disabilities.

(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated for the purposes of this section, $6,000,000 for fiscal year 1994, $15,000,000 for fiscal year 1995, $20,000,000 for fiscal year 1996, $20,000,000 for fiscal year 1997, and $20,000,000 for fiscal year 1998.

SEC. 307. APPLICATIONS FOR EDUCATION.

(a) IN GENERAL.—The Plan shall specify projects to develop and apply computing and networking technologies for use in education at all levels from early childhood education through higher education, including projects for the education and training of individuals with disabilities. The National Science Foundation shall be the lead agency for implementing the activities required by this section, and shall consult with the Department of Education in implementing those activities. Activities under this section shall include—

(1) projects, including support for acquisition of required computer hardware and software, that demonstrate the educational value of the Internet, including cost effectiveness, in providing for advances in distance learning and electronic classrooms, facilitating nationwide communication among educators and students, access to databases of information in digital format, and access to innovative curricular materials;

(2) development, testing, and evaluation of computer systems, computer software, and computer networks for—

(A) teacher training, including teachers in special education programs; and

(B) informal education outside of school, including workforce training in mathematics, science, and technology and in specific job-related skills, including literacy; and

(3) development, testing, and evaluation of advanced educational software and of network-based information resources.

(b) ELEMENTARY AND SECONDARY EDUCATION.—In accordance with subsection (a), applications for elementary, secondary, and vocational/technical education shall be designed to complement and strengthen ongoing national, State, and local educational restructuring and reform activities and shall include—

(1) projects in computing and networking that—

(A) provide for network connections among elementary and secondary schools in local regions and connections to the Internet to enable students and teachers to—

(i) communicate with their peers;

(ii) communicate with educators and students in institutions of higher education; and

(iii) access educational materials and other computing resources;

(B) address the needs of rural populations and of urban communities; and

(C) address the needs of individuals with disabilities;

(2) collection and dissemination of information about ongoing elementary and secondary educational projects, including special education projects, based on application of computing and networking technologies, and about other educational resources available over the Internet;

(3) development and evaluation of undergraduate courses in the educational applications of computing and networking for the instruction of students preparing for teaching careers, including courses that will ensure the early familiarization and training of these students in the use of the Internet; and

(4) development, testing, and evaluation of educational software designed for collaborative use over the Internet, including tools that will enable classroom teachers easily to adapt software to local conditions.

(c) COOPERATION.—In carrying out the requirements of this section, the National Science Foundation, the Department of Education, and other Federal agencies participating in such activities shall work with the computer hardware, computer software, and communications industries, authors and publishers of educational materials, State education departments, and local school districts, as appropriate.

(d) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the National Science Foundation for the purposes of this section, $16,000,000 for fiscal year 1994, $45,000,000 for fiscal year 1995, $60,000,000 for fiscal year 1996, $75,000,000 for fiscal year 1997, and $75,000,000 for fiscal year 1998.

SEC. 308. APPLICATIONS FOR HEALTH CARE.

(a) IN GENERAL.—The Plan shall specify projects to develop and apply high-performance computing and high-speed networking technologies for use in the health care sector, with the goal of improving the quality and enhancing the cost-effectiveness of health care. Special consideration shall be given to applications that are designed to lower health care costs. The Department of Health and Human Services, through the National Institutes of Health and the Centers for Disease Control and Prevention, shall be the lead agency for implementing the activities required by this section.

(b) CLINICAL INFORMATION SYSTEMS.—In accordance with subsection (a), applications related to clinical information systems shall include—

(1) testbed networks for linking hospitals, clinics, doctor's offices, medical schools, medical libraries, and universities to enable health care providers and researchers to share medical images and to develop computer-based records;

(2) software and visualization technology for visualizing the human anatomy and analyzing diagnostic images and records;

(3) virtual reality technology for simulating surgical and medical procedures;

(4) collaborative technology to allow several health care providers in remote locations to provide real-time treatment to patients;

(5) interactive technologies to allow health care providers to monitor, evaluate, and treat patients in nonclinical settings;

(6) database technology to provide health care providers with access to relevant medical information and literature;

(7) database technology for storing, accessing and transmitting patients' medical records while protecting the accuracy and privacy of those records;

(8) numerical simulation of chemical interactions relevant to reducing the time and cost of drug development;

(9) three dimensional geometric modeling and artificial intelligence methods for interpreting an array of medical images; and

(10) complex simulations of sociological populations affected disproportionately by selected diseases or disorders.

(c) HEALTH INFORMATION TO THE PUBLIC.—In accordance with subsection (a), applications related to delivery of health information to the public shall include—

(1) development, testing, and evaluation of database and network technologies for the storage of consumer-oriented, interactive, multimedia materials for health promotion, and for the distribution of such materials to public access points, such as community health and human service agencies, Centers for Independent Living established by the Rehabilitation Act of 1973, organizations established by title I of the Technology-Related Assistance for Individuals with Disabilities Act of 1988, schools, and public libraries;

(2) pilot programs to develop, test, and evaluate the effectiveness and cost efficiency of interactive, multimedia materials to assist patients in deciding among health care options;

(3) development and demonstration of human/computer interfaces to allow nonspecialists in computing and networking technologies ease of access to and use of databases of health information and networks providing health information service; and

(4) development, testing, and evaluation of database and network access technologies to provide individuals with health information, including health risk appraisal, preventative medical advice, and disease treatment options, which is oriented to nonhealth professionals and which is customized to take into consideration an individual's medical history.

(d) HEALTH DELIVERY SYSTEMS AND POPULATION DATA SETS.—In accordance with subsection (a), applications for health delivery systems and for gathering population data sets shall include—

(1) testbed networks and software that permits collaborative communication among local public and private health and human service providers, such as health centers, clinics, entitlement offices, and school-based clinics, to enable health and human service providers to work together in delivering coordinated services for at-risk populations;

(2) pilot programs to develop high speed communications networks and software for providing health care providers with—

(A) immediate, on-line access to up-to-date clinic-based health promotion and disease prevention recommendations from the Centers for Disease Control and Prevention and other Public Health Service agencies; and

(B) a two-way communications link with prevention specialists in State and local health departments, and other agencies with information germane to clinic-based health promotion and disease prevention; and

(3) development, testing, and evaluation of database technologies to provide clinicians with access to information to

guide and assist them in providing diagnosis, providing treatment, and providing advice regarding health promotion and disease prevention to patients, and to facilitate the gathering of systematic population data sets in compatible formats on the efficacy of treatments and on national health trends.

(e) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated to the Secretary of Health and Human Services for the purposes of this section, $22,000,000 for fiscal year 1994, $54,000,000 for fiscal year 1995, $72,000,000 for fiscal year 1996, $90,000,000 for fiscal year 1997, and $90,000,000 for fiscal year 1998.

SEC. 309. APPLICATIONS FOR LIBRARIES.

(a) IN GENERAL.—The Plan shall specify projects to develop technologies for "digital libraries" of electronic information. The National Science Foundation shall be the lead agency for implementing the activities required by this section, and in implementing this section shall take into account the needs of individuals with disabilities.

(b) DIGITAL LIBRARIES.—In accordance with subsection (a), activities to support the development of digital libraries shall include—

(1) development of advanced data storage systems capable of storing hundreds of trillions of bits of data and giving thousands of users simultaneous and nearly instantaneous access to that information;

(2) development of high-speed, highly accurate systems for converting printed text, page images, graphics, and photographic images into electronic form;

(3) development of database software capable of quickly searching, filtering, and summarizing large volumes of text, imagery, data, and sound;

(4) encouragement of the development and adoption of common standards and, where appropriate, common formats for electronic data;

(5) development of computer-based means to categorize and organize electronic information in a variety of formats;

(6) training of database users and librarians in the use of and development of electronic databases;

(7) development of means for simplifying the utilization of networked databases distributed around the Nation and around the world;

(8) development of visualization methods for quickly browsing large volumes of imagery; and

(9) development of means for protecting copyrighted material in electronic form, including, if technologically feasible, systems with capabilities for electronically identifying copyrighted works and for electronically indicating whether any permission which is required by title 17, United States Code, has been granted by the copyright owner.

(c) DEVELOPMENT OF PROTOTYPES.—In accordance with subsection (a), the Plan shall provide for the development of prototype digital libraries to serve as testbeds for the systems, software, standards, and methods developed under subsection (b). The development of prototype digital libraries may involve nonprofit, private institutions that collect and maintain specimens, materials, or other items

used in research, such as natural history museums. The prototype digital libraries shall be accessible by the public via the Internet. In carrying out this subsection, an evaluation shall be conducted of the suitability and utility of distributing electronic information over the Internet, including cataloging and evaluating the kinds of uses and determining barriers that impair use of the Internet for this purpose.

(d) DEVELOPMENT OF DATABASES OF REMOTE-SENSING IMAGES.—The National Aeronautics and Space Administration shall develop databases of software and remote-sensing images to be made available over computer networks.

(e) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated—

(1) to the National Science Foundation for the purposes of this section, $8,000,000 for fiscal year 1994, $16,000,000 for fiscal year 1995, $22,000,000 for fiscal year 1996, $32,000,000 for fiscal year 1997, and $32,000,000 for fiscal year 1998; and

(2) to the National Aeronautics and Space Administration for the purposes of this section, $4,000,000 for fiscal year 1994, $8,000,000 for fiscal year 1995, $10,000,000 for fiscal year 1996, $12,000,000 for fiscal year 1997, and $12,000,000 for fiscal year 1998.

SEC. 310. APPLICATIONS FOR GOVERNMENT INFORMATION.

(a) IN GENERAL.—The Plan shall specify projects needed to develop and apply high-performance computing and high-speed networking technologies to provide improved public access to information generated by Federal, State, and local governments, including access by individuals with disabilities.

(b) LEAD AGENCY.—The President shall designate a lead agency for implementing the activities required by this section. The lead agency shall issue policy guidelines designed to foster—

(1) a diversity of public and private sources for, and a competitive marketplace in, information products and services based on government information; and

(2) dissemination of government information to the public on a timely, equitable, and affordable basis and in a manner that will promote the usefulness of the information to the public.

(c) PROJECTS.—In accordance with subsection (a), projects shall be undertaken which—

(1) connect depository libraries and other sources of government information to the Internet to enable—

(A) access to Federal Government information and databases in electronic formats;

(B) access to State or local government information;

(C) access to related resources which enhance the use of government information, including databases available through State projects funded pursuant to the Technology-Related Assistance for Individuals with Disabilities Act of 1988; and

(D) linkages with other libraries and institutions to enhance use of government information; and

(2) demonstrate, test, and evaluate technologies to increase access to and to facilitate effective use of government informa-

tion and databases for support of research and education, economic development, and an informed citizenry.

(d) FEDERAL INFORMATION LOCATOR.—In accordance with subsection (a), an information locator system shall be established which is accessible by the public via the Internet and which provides citations to Federal information and guidance on how to obtain such information.

(e) AUTHORIZATION OF APPROPRIATIONS.—From sums otherwise authorized to be appropriated, there are authorized to be appropriated for the purposes of this section, $4,000,000 for fiscal year 1994, $12,000,000 for fiscal year 1995, $16,000,000 for fiscal year 1996, $21,000,000 for fiscal year 1997, and $21,000,000 for fiscal year 1998.

XIII. CORRESPONDENCE WITH OTHER COMMITTEES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON EDUCATION AND LABOR,
Washington, DC, June 10, 1993.

Hon. GEORGE E. BROWN, Jr.,
Chairman, Committee on Science, Space, and Technology, House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: We are waiting concerning sections 2, 3, 4, and 5 of H.R. 1757, the High Performance Computing and High Speed Networking Act of 1993, which we believe are under the shared jurisdiction of your committee and the Committee on Education and Labor.

These sections make numerous references to education at all levels and to libraries with respect to the application of high performance computing and high speed networking.

We understand the enclosed suggestions have been incorporated into a substitute bill to be marked up by the Subcommittee on Science. With these changes, we have no objection to the text of the bill. In order to expedite the consideration of H.R. 1757, we do not intend to seek referral of the bill, with the incorporated changes. However, in view of this committee's jurisdiction under clause 1(g) of House Rule X over education, generally, and in light of the continuing cooperation between our committees concerning such matters, we ask that you include this letter in the record of the debate on H.R. 1757 to protect this committee's jurisdictional interest.

With kind regards,
Sincerely,

WILLIAM D. FORD, *Chairman.*
WILLIAM F. GOODLING, *Ranking Republican.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
Washington, DC, June 28, 1993.

Hon. GEORGE BROWN,
Chairman, Committee on Science, Space, and Technology, House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: I understand the Committee on Science, Space, and Technology is now marking up H.R. 1757, the High Per-

formance Computing and High Speed Networking Applications Act of 1993. This legislation includes a provision establishing a National Research and Education Network Program and requiring the Department of Defense to support research and development of technologies associated with that program. The part of this provision pertaining to the Department of Defense falls within the jurisdiction of the Committee on Armed Services pursuant to House Rule X, clause 1(c).

In recognition of your committee's desire to bring this legislation expeditiously before the House of Representatives, the Committee on Armed Services will not seek a sequential referral of H.R. 1757 as a result of including the above described provision, without of course, waiving this committee's jurisdiction over the provision in question. This committee will also seek to be appointed conferees for this provision during any House-Senate conference.

I would appreciate your including this letter as a part of the report on H.R. 1757 and as part of the record during consideration of this bill by the House.

Sincerely,

RONALD V. DELLUMS, *Chairman.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, DC, June 24, 1993.

Hon. RONALD V. DELLUMS,
Chairman, Committee on Armed Services,
House of Representatives, Washington, DC.

DEAR MR. CHAIRMAN: Thank you for your letter of June 28, 1993, expressing your Committee's views regarding jurisdiction over certain provisions contained in H.R. 1757, the High Performance Computing and High Speed Networking Applications Act of 1993, which the Committee on Science, Space, and Technology expects to be reported in the near future. I acknowledge the jurisdictional claim of the Committee on Armed Services over the provisions cited in your letter. I appreciate your cooperation in permitting these provisions to move ahead for floor consideration without a sequential referral, and would be pleased to include your letter in the Committee's legislative report on H.R. 1757, and to include it in the record during consideration of the bill on the House floor in order to preserve your Committee's jurisdictional claims.

I look forward to continuing to cooperate with you on issues of mutual concern.

Sincerely,

GEORGE E. BROWN, Jr., *Chairman.*

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